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DISTRIBUTION AND ABUNDANCE OF GRAY WHALES OF THE OKHOTSK-KOREAN POPULATION IN NORTHEASTERN SAKHALIN WATERS IN JULY - NOVEMBER 2004

(based on shore, aerial and vessel-based surveys)

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ABSTRACT

The results of aerial, vessel and shore-based surveys of gray whales of the Okhotsk-Korean population conducted during the summer and fall period of 2004 within the framework of the Program for study and monitoring gray whales off the northeast coast of Sakhalin Island are presented in this report. Monitoring of the western gray whale population through the summer and fall revealed significant changes in the overall distribution of the animals among the two currently known feeding areas compared to previous years. In 2004, few sightings of whales were observed in the Offshore Area, where a significant number of animals had stayed on a regular basis in 2001 – 2003. A corresponding increase in the number of whales in the near-shore Piltun Area for 2004 was observed relative to 2001 – 2003. The reasons for the redistribution of whales are not yet clear, however, they do not appear to be the result of anthropogenic impact or deterioration of food resources in the Offshore Area. The redistribution may have been caused by the presence of higher than normal concentrations of easily accessible benthic and epibenthic food sources in the coastal waters, which attracted the animals to that area. The overall number of gray whales feeding in Sakhalin waters in 2004 appears to be similar to previous years despite the observed changes in their distribution.

The distribution of gray whales within the Piltun Area in 2004 indicated that the majority of whales (up to 70%) stayed in the northern part of the area for almost all of the feeding season. As in previous years, the majority of whales were sighted (60-85%) within a 4-kilometer zone of the coast in depths less than 15 m, although significant congregations of animals were observed in the northern part of the area in August and September at distances of 6 km or more from shore. This corresponded to unusually deep waters for whales (20-25 and even 30 m), compared to those observed in the Piltun Area previously. The explanation for elevated concentrations of whales in the northern part of the coastal water area and in deeper waters may be the presence of good food resources there such as benthos invertebrates and pelagic species such as sand lance.

Offshore seismic exploration work in the coastal waters at the northern edge of the Piltun Area was observed to occur in late September and the first half of October. This survey appears to have caused a change in the distribution of gray whales in the area in late September and early October 2004. However, as we have no details regarding this operation, delineating natural versus anthropogenic causes of any observed redistribution of whales was not possible.

The number of cows with the current years' calves observed in the Piltun Area in 2004 may be up to six pairs, suggesting that reproduction in the Okhotsk-Korean gray whale population has remained at a relatively constant level. In summary, the status of the feeding grouping of gray whales present in the coastal waters of Northeastern Sakhalin during the summer-fall period of 2004 appeared stable, and there are currently no visible signs of a direct or indirect negative impact on this population from the production or development activity under the Sakhalin-1 and Sakhalin-2 projects.

Keywords: gray whale, Sakhalin, Piltun, survey, distribution, abundance, groups, calves, food resources, feeding, migration, depths, anthropogenic impact.

1.0 INTRODUCTION

The aerial, vessel and shore-based surveys of the western gray whale in Sakhalin shelf waters, the results of which are presented in this report, were conducted during the summer-fall period of 2004 under the "Program for Study and Monitoring of the Okhotsk-Korean Gray Whale Population off the Northeast Coast of Sakhalin Island". This research has been endorsed by the appropriate Russian organizations and agencies (the RF Ministry of Natural Resources, the Federal Service for Supervision of the Use of Natural Resources (ROSPRIRODNADZOR), the Russian Federal Fishery Agency, the Federal Service for Veterinary and Phytosanitary Supervision, the Sakhalin Directorate of ROSPRIRODNADZOR, and the Sakhalin Basin Administration for Conservation and Rehabilitation of Fish Resources (SAKHALINRYBVOD).

The program objective is in alignment with the international Russian-American "Joint Declaration on Ensuring the Preservation of Biodiversity in the Area of Sakhalin Island" (1997). The objective of this program is to monitor the marine mammals that populate the region in the presence of ongoing oil and gas field development on the northeast shelf of the island. This objective has particular importance given that the coastal areas of the northeastern shelf of Sakhalin Island are key feeding grounds for the extremely small Okhotsk-Korean (western) gray whale population (*Eschrichtius robustus*) during the summer-fall season. The low number of remaining western gray whales, currently estimated at around 100 individuals (Blokhin, 1996; Sobolevsky, 1998, 2000, 2001; Weller et al., 1999, 2000, 2001; Würsig et al., 1999, 2000), has served as the basis for inclusion of this population in the most sensitive conservation categories, critically endangered by the International Union for Conservation of Nature (IUCN) and Category 1 in the Russian Red Book. The known feeding areas for this population are in proximity to the Piltun-Astokh and Odoptu fields currently under development within the scope of the Sakhalin-1 and Sakhalin-2 projects. It is therefore important to monitor key components of the biology and ecology of the western gray whale population including the distribution and abundance surveys outlined in this report.

This work is a continuation and further development of the western gray whale survey program conducted within the framework of the Russian "Program for Study and Monitoring of the Okhotsk-Korean Gray Whale Population off the Northeast Coast of Sakhalin Island" in 2002 and 2003. This work was performed by research institutes of the State Fisheries Committee (Goskomrybolovstvo) system and the RF Academy of Sciences and was funded by Exxon

Neftegas Limited (ENL) and Sakhalin Energy Investment Company Limited (SEIC), the operators of the Sakhalin-1 and Sakhalin-2 projects, respectively.

Scientists from the All-Russian Research Institute of Fisheries and Oceanography (VNIRO), the Pacific Research Institute of Fisheries and Oceanography (TINRO-Center), the Institute of Marine Biology (IBM) of the Far East Branch of the Russian Academy of Sciences (DVO RAN), and the Far East State University (DVGU) took part in the survey work in 2004. The 2004 program was funded, as previously, by ENL and SEIC in accordance with the Production Sharing Agreement between the Government of the Russian Federation, the Sakhalin Oblast Administration and ENL (Article 24.2), the corresponding Agreement with SEIC (Article 25.f-7), and the recommendations of the State Environmental Expert Review for the Sakhalin-1 (2002 and 2004) and Sakhalin-2 (1998 and 2003) projects.

1.1 Rationale for Program

The Okhotsk-Korean or western gray whale population is one of the smallest of all the world's populations of large whales. Currently the total population is estimated at only about 100 animals (Blokhin, 1996; Sobolevsky, 1998, 2000, 2001; Weller et al., 1999, 2000, 2001; Würsig et al., 1999, 2000); However, it has been suggested that the population could reach 115-120 individuals (Vladimirov, 2002).

During the summer and fall months (i.e., the feeding season) it is currently postulated that the population is concentrated in the Okhotsk Sea off the northeast coast of Sakhalin Island (e.g. Blokhin, 1996; Sobolevsky, 2000, 2001; Blokhin et al., 1985; Würsig et al., 1999, 2000; Weller et al., 2000, 2001, 2002), although occasional anecdotal sightings from other locations have been reported. For a long time it was thought that the shallow bays on the southern coast of the Korean Peninsula were the wintering ground for whales of the Okhotsk-Korean population (hence its name). In recent years, however, data have been obtained showing that gray whales are sighted off the Korean coast only during migrations, and the whales potentially winter and breed somewhere in the South China Sea, probably off the coast of Guandun Province and in the waters around Hainan Island (Rice, 1998). However, neither the wintering grounds nor the routes of seasonal migrations of the gray whales have yet been established.

The coastal area of northeastern Sakhalin near Piltun, Chayvo and Niyskiy bays is the only known feeding area of the Okhotsk-Korean gray whale population, where the entire

population concentrates during the summer and fall months. Gray whales, in contrast to all other cetaceans, feed primarily on benthic (bottom) and epibenthic (near-bottom) invertebrates. The exceptionally high biomass of preferred nutritional targets in the area (up to 1 kg/m^2 or more – Koblikov, 1986, Fadeev, 2003; Fadeev 2004) is suggested as the reason for the formation of feeding groupings of gray whales in the specific area near the shores of northeastern Sakhalin. In recent years, the whales have been feeding there in two defined areas of the shelf waters which are located not far apart – the Piltun and Offshore areas (Figure 1).

Gray whales appear off the northeast coast of Sakhalin in late May – early June, when the water becomes free of ice, and remain there until the end of fall. They then begin to depart the area for their fall migration to the wintering grounds, leaving the area by November – early December, when the sea begins to freeze again.

The gray whales actively feed only during the summer-fall season when they come to the shores of Sakhalin Island, while the rest of the year, including the breeding season, they survive almost exclusively on accumulated energy reserves stored mainly in a layer of subcutaneous blubber. As a result, it is important to preserve normal feeding conditions to ensure the overall vital activity of gray whales. Data collected during recent years in the course of research programs on the Okhotsk-Korean gray whale population (Weller et al., 1999, 2000, 2001, 2002, 2003; SC IWC Report, 2002) attests to the fact that the reproductive potential of the population is currently at an extremely low level, and the reproduction rate in the population is very low. No more than 25 productive cows were identified in the population in 2003, and the total number of calves observed in 1997-2003, when regular, active observations were conducted, was only 40, i.e., an average of 5.7 calves per year (Weller et al., 2004).

The natural annual mortality rate for the Okhotsk-Korean population has been estimated at 30-40% for gray whale offspring (ranging in age from approximately 6 months to 1.5 years) and 6% for whales more than 1 year old (Bradford et al., 2002, 2003). It is possible, however, that many of the calves sighted at Piltun spend the entire following year in regions further south and may not come to the regular feeding area until they reach sexual maturity, as a result of which the mortality estimate may be overstated. This conclusion is also supported by the fact that several new mature whales not previously sighted are observed there every year and that calves that had not been seen as yearlings have reappeared at Piltun in subsequent years.

Signs of deterioration and subsequent recovery in the physical condition of the whales have appeared in recent years (Weller et al., 2000, 2001, 2002, 2003). In 1999, for example, 10 gray whales that looked emaciated (or 14.7% of the total number of animals more than one year old identified that year) were observed in the Piltun Bay area. In 2000, the number of such whales had increased to 27 individuals (49.1%). However, the number of emaciated whales decreased to 19 in 2001 and nine in 2002 and 2003. The emaciated whales included about 10 of the cows that had borne offspring. The later fate of these whales (i.e., their survival rate) is not yet entirely clear, but a number of them recovered their physical condition in subsequent years (Yakovlev and Tyurneva 2004, 2005). Potential explanations for the appearance of emaciated gray whales in the Okhotsk-Korean population, other than potential physiological stress placed on mothers from producing offspring, have not yet been determined.

Due to its extremely small size, the Okhotsk-Korean gray whale population has been entered in category 1 of the Russian Red Book as "endangered." The International Union for Conservation of Nature (IUCN) also assigned this population the status "critically endangered" in 2000. The small size of the population coupled with the "skinny whale" phenomena observed in recent years necessitates that annual monitoring of the population including regular monitoring of the distribution and abundance be performed. This will allow the changing demographic characteristics of the western gray whale population to be monitored and provide a measure of the overall status of the population.

1.2 Survey Objectives

The objectives of the survey work in 2004 were the study and monitoring of the spatial and seasonal features of the distribution of gray whales in the coastal waters of northeastern Sakhalin. This serves as a practical indicator of the status of the Okhotsk-Korean population and reflects the status of the summer-fall feeding habitat.

The area of the survey work in 2004 covered the coastal area of the northeast shelf of the island, including the waters of licensed production areas for the Sakhalin-1 (Odoptu, Chayvo and Arkutun-Dagi fields) and Sakhalin-2 projects (Piltun-Astokh field).

Three types of distribution surveys were conducted within the scope of the program in 2004:

- aerial surveys using the An-28 aircraft in the Piltun and Offshore areas, as well as in neighboring waters, from July to December;
- vessel-based surveys from aboard the research vessel *Akademik Oparin* in the Piltun and Offshore areas in August-September;
- shore-based surveys in the Piltun Area from July to October.

The main objective of the aerial surveys was to obtain data on the seasonal distribution of gray whales in key feeding areas and the surrounding waters and the most noticeable changes during the summer-fall season, including at the very end of the season when it is difficult to obtain this information using other survey techniques.

The most important task of vessel-based surveys was more detailed assessment of the abundance and distribution of gray whales in the feeding areas during the period of the maximum seasonal concentration of animals in the waters of northeastern Sakhalin. This includes gathering of information on the numbers of whales in groups, and inspection of the coastal waters off the island on the route of the research vessel *Akademik Oparin* from Vladivostok to the site of the main work and back to identify possible new gray whale feeding grounds.

The main objective of shore-based surveys was to study the nature of the distribution of gray whales in the near-shore Piltun Area including intra-seasonal variations. The specific tasks of the surveys were as follows:

- determining the distribution of gray whales in coastal waters from Odoptu Bay in the north to Chayvo Bay in the south and the features of its seasonal dynamics;
- identifying the temporal and spatial distribution of gray whales in the area in question during the feeding season and the features of their local movements within the area;
- estimate the number of cows with the current year's young arriving at the Piltun Area during the summer;
- estimate the total number of whales in the Piltun Area, insofar as possible, based on the data collected;
- establishing the time for breaking up of cow/calf pairs and the transition of the current year's young to independent feeding, as well as recording anomalies (when observed) in the behavior of the gray whales, including anomalies related to the possible impact of anthropogenic factors (e.g. the presence and operation of ships in the area); and

- augmenting data collected by aerial and vessel surveys on the distribution and abundance of other species of marine mammals.

Several shore-based surveys were also conducted simultaneously with vessel and aerial surveys of gray whales in the same area to determine the comparability of results obtained by the different methods.

Only proven, reliable survey methods that were suited to the designated objectives and ensured reliable results were obtained were used in this work.

2.0 MATERIALS AND METHODS

2.1 Area and Organization of Work

In recent years, western gray whales have concentrated in two adjacent areas located near Piltun, Chayvo and Niyskiy bays (between N52°20' and N53°30') off northeastern Sakhalin Island. The first of these areas, the traditional feeding area (normally called the "near-shore" or "Piltun" area), is approximately 50 miles long and is located opposite Piltun Bay. Western gray whales have most commonly been observed in the shelf shallows at depths up to 20-25 m, mainly within 4-5 km from shore (the 20-m isobath runs about 3 km from shore, with the exception of the most southern part of the Piltun Area). The second feeding area, discovered in 2001 (Maminov and Yakovlev 2002, Yazvenko et al. 2002, Blokhin et al. 2002, Meier et al., 2002) is called the "Offshore" Area, is located 40-50 km south-southeast of the first, opposite Chayvo and Niyskiy bays, 25-40 km from shore in waters 35-45 m deep (Figure 1).

The coastal shallows opposite Piltun Bay have special importance for the feeding of gray whales of the Okhotsk-Korean population, since this is the only known location where cows are observed weaning their current calves and teaching them foraging skills before the transition to independent life. This circumstance highlights the importance of regular monitoring of the animals in this area. In addition, the fact that this area is located near some of the existing and planned onshore and offshore facilities of the oil-producing complexes of the Sakhalin-1 and Sakhalin-2 projects (Figure 1) also dictates the need for detailed monitoring. As western gray whales stay in direct proximity to the shore in the area, it is possible to view practically 100% of the Piltun feeding waters from coastal observation points in good weather. This facilitates performing repeated surveys, thus making it possible to obtain more detailed information on the distribution of western gray whales than available from other observation platforms (aerial or

vessel based). As outlined previously, a significant concentration of gray whales in the Offshore Area were observed for the first time in 2001. The animals feed there at substantially greater depths than in the near-shore area, and no cows with calves have been observed there to date. This is probably due to the fact that it is difficult for calves to dive to a depth that is so great for them and therefore it is difficult to learn to forage there. In addition, it is possible that the Piltun Area affords greater protection from predators such as killer whales.

Previous work (Fadeev, 2003: Fadeev 2004) demonstrated that the benthos resources in the Offshore Area are sufficient for normal feeding of quite a large number of animals. Further, in 2002 and 2003, the level feeding activity of adult gray whales there was not lower than in the waters near shore (Blokhin et al., 2003, 2004; Fadeev, 2003, 2004). The distance of the Offshore Area from shore makes it impossible to conduct surveys there from shore. Only vessel or aerial based surveys are therefore appropriate for the Offshore Area. Only a comparatively small proportion of the whales present in the flyby area can be seen from the air as many of them are underwater at the moment the aircraft flies over them and remain uncounted. This is overcome by using line-transect theory, which accounts for animals that would be missed by aerial overflights. Aerial surveys can also provide snapshots of distribution when safety considerations preclude vessel based surveys. For example, surveys can be conducted in November and December when vessel or shore-based surveys are impractical. Vessel-based surveys provide a platform in which a greater proportion of the whales can be seen due to the lower speed of the platform. All survey techniques, can be difficult to implement daily due to the prevailing foggy and variable Sakhalin summer weather.

To obtain the most comprehensive and detailed information possible on the distribution of gray whales in their feeding area off Sakhalin, all survey methods outlined were combined to accomplish the stated objectives. For example, aerial surveys were conducted approximately once a month, from July to December to obtain an overall picture of the distribution of gray whales throughout their feeding area. Vessel-based surveys were conducted in August-September to gather more detailed data on the abundance and distribution of the animals in the near-shore and, in particular, offshore areas during the period of the highest concentration of gray whales in Sakhalin waters. Shore-based surveys were conducted as often as possible from early July to mid-October to obtain the information on the distribution of whales in Piltun waters throughout the summer-fall season on as small a time interval as possible. This approach

provided detailed information on the nature of the presence of gray whales during their summer-fall feeding period. This later proved especially valuable given the change in the distribution of whales in 2004 compared with previous years.

The methodology and design for each survey are covered in greater detail in the following sections.

2.1.1 Aerial Surveys

2.1.1.1 Survey Locations

Aerial surveys were conducted in 2004 in the Piltun Area and the Offshore Area – based on an intensive grid of spatially fixed transects used to obtain more detailed information on features of the distribution of the whales in their summer-fall habitats.

The grid of survey transects in the Piltun Area covered the coastal waters adjacent to Piltun Bay. The southern boundary of the flyover zone in this area was at N52°43'50", while the northern boundary was at N53°30'33". The four main survey transects, each of which is 88 km long, were laid out parallel to the shoreline at 2 km intervals (the closest to the shoreline was 1 km from shore, while the farthest was 7 km from shore). In addition to the scheduled complete surveys, which included all four transects, additional surveys were conducted on transects 1 and 2 in flights back and forth between Okha and the Offshore Area. Each transect was divided into five large sectors and were numbered from south to north (Figure 3). For more detailed analysis of the spatial distribution of whales in the Piltun Area, the survey area was also divided into 44 minisectors with dimensions of 2 × 2 km (Figure 3). In addition, the decision was made in the course of the work to inspect waters farther out to sea than the main near-shore feeding area in September-October. For this purpose, four more transects were added to the east of the initial flyover zone during those months (Figure 2). The area of water surveyed during the a Piltun survey was approximately 700 km^2 when four transects were flown.

The survey transect grid in the Offshore Area (Figure 2) covered all the gray whale feeding waters mapped in 2001-2003. In this area, 12 aerial survey transects were laid out with a spacing of 3 km. The southern points of the transects were at N51°52'08" north latitude, and the northern points were at N52°25'02". The first transect (west) ran along E143°23', and the twelfth (east) transect was at E143°86'the area north of the Offshore feeding, (transects 4

through 9) were extended farther north and were each approximately 95 km long (Figure 2). In order to provide the possibility of more detailed analysis of the distribution of whales in the Offshore Area, the main survey water area there was divided latitudinally into seven sectors. The area of water surveyed when extended transects were flown in the Offshore Area was approximately 3000 km^2 for a full survey.

2.1.1.2 Survey Methodology

As in previous years, a twin-engine An-28 airplane from Vostok Aviation (Khabarovsk) was used for the aerial surveys in 2004. This plane is best suited to performing surveys of marine mammals in the northeastern Sakhalin area due to flight speed and range on a single fueling, in addition to safety considerations. The flights were made from the Okha airport. The aircraft was equipped with a radar altimeter and a Garmin III GPS satellite navigation system, into which the coordinates of the survey transects in both work areas were entered. This made it possible for the crew to get their bearings independently and to accomplish accurate flights on the designated route at the prescribed altitude.

The scientific team also had a Garmin 12XL personal GPS navigator that automatically recorded the position of the aircraft and the exact time every 30 seconds and stored up to 500 geographic positions in memory. All survey personnel had digital watches and were synchronized with the chronometer of the GPS navigation system before each flight. To determine the vertical angles between the aircraft and the whales and other targets sighted, which is necessary for subsequent calculation of the distances between the aircraft and the targets, Suunto PM 5/360 PC clinometers were used. They were also used to monitor positioning accuracy for the outer boundary of the survey zone. All observers carried portable voice recorders to record information during the surveys.

One of the key conditions for effectiveness of aerial surveys is to conduct them only in good weather. The main limiting factor in this regard is the presence of whitecaps on the sea surface, which, based on experience, have a substantial negative effect on the survey results. In some cases, however, the weather deteriorated during a flight or was different in different parts of the area; hence it was sometimes necessary to continue a survey begun previously even when limited whitecaps were present. Data on hydrometeorological conditions during the flight period were also recorded.

In some cases, under good weather conditions, gray whales can be sighted at considerable distances from the aircraft, outside the 30^{o} viewing angle. In subsequent quantitative analysis of the number of animals sighted, however, one can use only the data on animals recorded on the survey transects (i.e., within clinometer readings of 30 - 110%). In flights at an altitude of 300 m, this corresponded to a survey band of 730 m on each side (from 270 m to 1 km from the transect line), while at an altitude of 500 m, it was about 1200 m (from 450 to 1650 m from the transect line – Figure 4). When characterizing the overall distribution of whales in the Piltun and Offshore areas, data was used from all sightings of animals within a clinometer observation zone of 10-140%, as well as from whale sightings by airplane crew members, who sometimes noticed animals that were outside the observers' field of vision (e.g. under the aircraft).

During aerial surveys, the flight speed was kept as close as possible to 200 km/h, although it sometimes varied from 180 to 220-230 km/h from one transect to another, depending upon the wind direction and velocity. In good weather, at these speeds, the observers were able to see the whales for 15-20 seconds after sighting them in viewing sectors in front of the aircraft on its course.

The scientific team taking part in the flights included two survey observers (one on each side) and one data-logging specialist, who worked with the personal GPS navigator to record the coordinates of turning points of the transects and the locations of whale sightings. The survey observers in the aerial surveys for 2004 were experienced TINRO-Center specialists S. A. Blokhin, N. V. Doroshenko (July-October) and M. K. Maminov (November-December), and the data logger was I. P. Marchenko (Far East State University – DVGU). A stationary intercom system was used for communication between scientific team members and the airplane crew. The observers' seats were at the front windows in the nose of the aircraft cabin, which made it possible for them to conduct unhampered observations of the the sea below. The survey observers used their voice recorders to record information throughout the flight on the whales sighted and the hydrometeorological conditions (cloud conditions, wind direction and velocity, air temperature, presence of fog, visibility, wave conditions, sun glare on the sea surface, whitecaps, etc.).

The survey personnel observed the sea continuously during flights, paying particular attention to identifying whales within the main survey zone (from 270 to 1000 m on each side of the aircraft). When a whale came into view, the survey observer would report the sighting to the

data logger via the intercom, who would record the location on the GPS navigator at the moment the animal was abreast of the aircraft, enter this information on a data form and simultaneously pass this to the observer who sighted the whale via the communication system. When whales or groups of whales were sighted, the number of animals, the presence or absence of characteristic mud plumes next to the animals indicating that they were feeding on benthic organisms, the orientation of the whales indicating their direction of movement and the nature of the animals' activity were recorded. The vertical angle between the aircraft and each whale or group of whales was measured (in percent) using a clinometer when they were abreast of the aircraft (the altitude of the aircraft was also recorded).

Sightings of mud plumes from gray whales feeding on benthos were recorded regardless of whether the whale was actually present at the plume. The location according to the GPS navigator and the vertical angle according to the clinometer were determined for each mud plume in a manner similar to the method used for whale sightings. Since the airplane covers more than 3 km per minute, and the gray whales in the Piltun Area stay under water when diving for an average of more than 2 min (Gailey et al., 2004), aerial observers naturally fail to see some of the whales present in the survey waters, and mud plumes from benthos feeding, which stay visible for a few minutes, are therefore helpful as indicators of the presence of one or several gray whales, even if the whales themselves are not sighted as the aircraft flies over the location.

All information recorded during a flyover was transferred from the voice recorders to data forms and to computer using MS Excel worksheets at the end of the flight. Coordinate data from the GPS navigator was also transferred to computer using the Waypoint+ program.

2.1.1.3 Whale Coordinate Calculation

The angle to a whale sighting point was determined as a percentage using a clinometer, and the percentage was then converted to degrees and radians. The distance to the whale was determined by the formula $L = flight\ altitude / tan\ (viewing\ angle)$. Since the survey transects were oriented exactly or almost exactly north to south, the latitude of the aircraft at the moment an animal was sighted as taken as the latitude of the whale in determining the coordinates of the whales sighted. The longitude of the point at which an animal was sighted was determined according to the following formula developed by LGL Limited (Sidney, British Columbia, Canada):

Longitude = longitude of aircraft position + Acos (**[**Cos (distance ÷ (1852 × 60)) – Sin (longitude of aircraft position) × Sin (longitude of whale location point)**]** ÷ **[**Cos (longitude of aircraft position) × Cos (longitude of whale location point)**]**).

2.1.1.4 Minimizing Impact on Whales

During survey work, the airplane never descended below 300 m above the sea, since this flight altitude, as demonstrated by many years' experience in aerial surveys of marine mammals in Far East seas by Russian experts (mainly from TINRO-Center) in the 1970's and 1980's, has no noticeable impact on whale behavior, while allowing reliable observation of the whales during flyovers.

2.1.1.5 Data Analysis

The computer programs MS Excel, Surfer and Statistics were used for statistical processing of the survey data. Charts of the distribution of gray whales based on aerial survey data were plotted for both feeding areas and for each series of surveys. Animals recorded during the flights within an observation zone of 10-140% were included in the charts. The ArcView software package was used to prepare the charts.

2.1.2 Vessel Based Surveys

2.1.2.1 Survey Locations

Vessel surveys of gray whales in the Piltun Area were conducted in 2004 on a route along the Sakhalin shoreline at a distance of 2-2.5 km from shore (Table 7). The boundaries of the survey waters in the near-shore area were N52°30′ in the south, and N53°30′ in the north. The length of the survey transect was approximately 100 km. On days when visibility was good enough to allow vessel surveys to take place approximately 3 km either side of the vessel was observed, allowing for a total survey area of approximately 600 km^2 in the Piltun Area. The vessel survey of gray whales in the Offshore Area was conducted on nine transects oriented from east to west in a rectangle with boundaries at N51°27′ in the south, N52°25′ in the north, E143°30' in the east and E143° 00' in the west (Figure 5). The interval between adjacent

transects was 3.5 nautical miles (6.5 km). The offshore survey therefore covered approximately 1500 km^2 when all survey transects were covered.

2.1.2.2 Survey Methodology

Vessel surveys were conducted in 2004 aboard the research vessel *Academik Oparin*. Survey observers (V. L. Vladimirov and M. K. Maminov) simultaneously recorded marine mammals on both sides of the vessel from the pilothouse during daylight hours every day, weather permitting, from the time the ship left Vladivostok until it returned. The elevation of the observation point was 10 m above sea level. For remote observation of marine mammals, determining their species and the nature of their activity, and estimating the sizes of the animals, the survey observers used Fujinon 7×50 FMTRC-SX 7°30' reticule binoculars. Members of the ship's crew also participated in non-scheduled surveying as much as possible.

The survey work was done at a cruising speed of 11-11.5 knots. A GPS system was used to determine the exact position of the vessel during the surveys. The direction of movement of the animals relative to the vessel was defined in terms of a clock face, assuming that 12 o'clock on the clock face corresponded to the direction of the ship's own movement. The visual estimation of distance to the animals sighted was most often determined when they were abreast of the vessel.

Due to the distance between both feeding areas of gray whales (Piltun and Offshore) vessel based surveys require a minimum of two days to cover both both areas.

Therefore there is the potential for an animal to move between the two areas and be counted twice in the survey. Since the research vessel *Akademik Oparin* was involved in a number of components of the marine research program (taking photographs and video of the whales for photographic identification, and performing acoustic and hydrobiological studies) in addition to survey work, the gray whale surveys in a number of cases opportunistically were conducted concurrently with other research. Opportunistic surveys in the Piltun Area were sometimes conducted on routes farther from shore (up to 4-5 km) or with brief stops (not more than one hour). Gray whale survey work was performed only with good visibility (at least 6-8 km) and smooth seas (wave conditions rated no higher than 3 points on the Beaufort scale). Due to the possibility of induced error from non-standard surveying protocols, these "concurrent" surveys, are considered only as a supplementary source of information with respect to the

distribution of animals in the area and were not used in assessing the abundance of whales. It should also be noted that the lengths of opportunistic survey routes in the Piltun Area were not always consisitent, but always included the main gray whale feeding area. Thus, over the season, part of the Piltun Area was observable during days when dedicated vessel surveys were not performed.

Information on the date and time of sightings of animals, their species, and the numbers of animals in groups, the distance from the vessel, the position and course of the vessel, and the weather and visibility was recorded immediately on a special data form (Appendix 1) and transferred to computer at the end of each working day.

2.1.2.3 Whale Coordinate Calculation

The coordinates of gray whales recorded were determined according to the following formulas:

$$a = \frac{v + (c \times \mathit{Cos}\ d)}{1854/60} \qquad A = \frac{k + (c \times \mathit{Sin}\ d)}{1854 \times (\mathit{Cos}\ v/60)}$$

where a = latitude of the whale sighting point, A = longitude of the whale sighting point, v = latitude of vessel position, k = longitude of vessel position, c = distance to whale sighting point (m), d = angle to whale (radians) = course of vessel + angle to whale relative to vessel (1 hour on clock face = 30°).

2.1.2.4 Minimizing Impact on Whales

As vessel surveys inevitably involve the research vessel's passing through areas frequented by gray whales, specific whale safety protocols have been developed by LGL Limited, which govern the precedence rules for the vessel. The adherance of these protocols by the captain of the research vessel *Akademik Oparin* and the scientific team ensured minimal disturbance to gray in the process of survey and other work (Appendix 2).

2.1.2.5 Data Analysis

Statistical analysis of the data collected in the course of the vessel survey program was performed with MS Excel, and gray whales distribution charts were plotted with ArcView.

2.1.3 Shore-based surveys

2.1.3.1 Survey Locations

The coastline adjacent to the Piltun Area, stretching approximately from the mouth of Ekhabi Bay in the north to the mouth of Chayvo Bay in the south (i.e., about 120 km along the Sakhalin coast), is divided into two parts by the channel connecting Piltun Bay with the sea. This necessitated that the survey area was divided accordingly into two parts – the Odoptu-Piltun (north) section, covering the waters north of the mouth of Piltun Bay, and the Astokh-Chayvo (south) section, which occupies the coastal waters south of the mouth of Piltun Bay (Figure 6).

Permanent observation stations located approximately 8-10 km apart at points on high ground along the coast were established and their locations fixed within the two sections (Table 1). The distance between observation stations was not always the same, since their locations were selected according to the terrain (the highest points on shore with the best view of the offshore waters were chosen). A series of stations from which similar shore-based survey work was performed in 2003 (Melnikov and Starodymov, 2004) were used for the surveys in the north section. The observation stations in the north section in 2004 were located approximately twice as far apart as the previous year in order to reduce the probability of repeated counting of the same whales in adjacent sectors of neighboring survey zones. On the south Astokh Bar and the adjacent area of the coast in the direction of Chayvo Spit, where surveys had not been conducted previously, the points for future observation stations were tentatively marked on a map before the start of the work, and their precise locations were adjusted later on site. As the southernmost point of Chayvo Spit is practically inaccessible even for off-road vehicles, and there is little elevation near the end of the spit, the southernmost observation station was established about 15 km from the end of the spit.

Shore-based surveys of gray whales were conducted by two survey teams, one of which (the north team) conducted surveys in the Odoptu-Piltun section, while the other (the south team) performed surveys in the Astokh-Chayvo section. There was a periodic rotation of team

members during the season, since S. A. Blokhin, N. V. Doroshenko and I. P. Marchenko simultaneously participated in the aerial survey work, as a result of which A. G. Afanasiev-Grigoriev, A. V. Vladimirov and A. D. Chernetskiy moved from one team to another to replace them temporarily (only S. A. Tyurin was on the north team for the entire survey period). V. A. Vladimirov also took part in the shore-based survey program from 3 September to 14 September.

The weather conditions in northeastern Sakhalin were relatively favorable for conducting the surveys in July-October 2004 – about 50% of the days each month were suitable for surveying whales. Survey work was not performed or was halted only when the visibility at sea was reduced to 2-3 km due to fog, sea state was above level 4, wind speed was above 10 m/sec, numerous whitecaps were observed, or during rain or snow (in October). Data on daily visibility, air temperature and wind direction and strength in the Odoptu Bay area during the study period, kindly provided to us by the weather station there are given in Appendix 3. Due to the significantly broader band of coastal shallows in the Astokh-Chayvo section, wave conditions in the presence of regular east winds of the same strength were normally more severe than in the deeper waters of the Odoptu-Piltun lowering the total number of surveys in the south area, comparatively.

Due to the difficult terrain on the Sakhalin coast, off-road vehicles were used for conducting the route surveys – a Ural truck in the Odoptu-Piltun section, and a Zil-131 truck at first and then four-wheel-drive Nissan Safari and Toyota Highlux Surf vehicles provided by ENL in the Astokh-Chayvo section. The use of these vehicles made it possible for the teams to move promptly along the shore from one observation station to another, thus minimizing the time interval between surveys from adjacent stations and reducing the probability of double counting.

2.1.3.2 Elevation and Position of Observation Stations

Precise coordinates, the distance from the shoreline and the elevation above sea level were determined for all the observation stations used in the shore-based gray whale surveys (Table 1). This was necessary for subsequent calculations of the distances to the whales sighted in the surveys and their coordinates. These parameters had already been computed in 2003 by the shore-based survey team led by V. V. Melnikov (Melnikov and Starodymov, 2004) for observation stations 1-15 in the Odoptu-Piltun section.

The coordinates of observation stations in the Astokh-Chayvo section (stations 20-24) were determined using a GPS portable navigator (Garmin e-Trex Legend); Observation station heights were computed by both an inclinometer and a theodolite. Initially station height calculations were performed using the following parameters:

- the time of low tide on the offshore side of Astokh Bar calculated using a tide table for Chayvo Bay;
- the coordinates of points on the shoreline opposite the observation stations were determined for low tide, their elevations were taken as 0 m above sea level, and the angles to the tops of the respective observation stations from these points *(ά)*;
- based on the coordinates of the points at the shoreline and the coordinates of the observation stations, the distances between them were calculated on the projection *(L);*
- the elevations of the observation stations were then approximated using the formula:

$$H = L \times tg\ \acute{\alpha}\ .$$

where H is the height of the observation station, L = the distance of a predetermined position to the observation station and $tg\ \acute{\alpha}$ is the tangent of the angle between H and L.

Although the described method contained a level of error in determining the elevations of observation stations, it nevertheless made it possible for the south team to determine the locations of whales in the process of the field work, allowing preparation of near real time plots for the distribution of whales. The elevations of all observation stations along the entire survey coastline were refined using a theodolite in late September by the whale behavior study team working on Sakhalin under the auspices of the overall program.

2.1.3.3 Survey Methodology

The whale surveys were conducted during daylight hours when visibility was adequate. The survey methods used were based on the principle of regular viewing (scanning) of the entire water area visible from the observation stations and determining the azimuths and distances to the whales observed, which then made it possible, after data processing, to compute the geographic coordinates of each animal. Accordingly, Special Fujinon 7x50 FMTRC-SX 7°30' binoculars with a built-in compass and rangefinder were used for the surveys. All team

members were trained to follow the specific protocol outlined during a kick-off meeting in Vladivostok before the start of the field work.

Shore-based surveys of gray whales and other marine mammals were conducted by the two teams along coordinated, synchronized routes. The work was performed as follows.

The north group, based in a Sakhalinmorneftegaz housing unit between Odoptu and Piltun bays, started the survey from the northernmost observation station (station 1) and moved south. The route from observation station 1 to station 15 took an average of 5-6 hours. The group spent the night in a hunting trailer near the mouth of Piltun Bay (near station 15) and repeated the survey from south to north, from station 15 to station 1, the next day.

The south team was permanently based in a trailer between station 21 and station 22, in the southern part of Astokh Bar. Running the full route from station 20 to station 24 took approximately 3 hours. The survey direction for this team was matched with the activities of the north team. The work of the two teams was structured to synchronize the survey time at the neighboring observation stations near the mouth of Piltun Bay (station 15 and station 20) and thus ensure comparable and representative survey data was collected by the two teams in the different sections near the mouth of Piltun Bay. Therefore, if the north team conducted a survey from station 1 to station 15, the south team conducted a survey moving in the opposite direction, from station 24 to station 20, allowing simultaneous surveys at station 15 and station 20 (communicated by satellite telephone). In similar fashion, if the north group started a survey from station 15 in the morning, the south started its survey from station 20, allowing initial simultaneous surveys by the two groups.

During the survey, detailed observation (scanning) of the visible water area of the sea was performed at each observation station. The scanning procedure was the same at all stations: the survey water area was divided into 9-degree sectors (Figure 7), and an observation time of 1 minute was strictly maintained in each sector to ensure consistency of survey efforts throughout the water area under observation. Since the total observation sector of the sea at observation stations was not always 180° (it was somewhat narrower or broader at some stations due to the curvature of the shoreline), the total scanning time at different observation stations ranged from 17 to 20 minutes. Three people took part in the scanning: two conducted continuous simultaneous observation of the visible water area by 9-degree sectors, moving from sector to sector in sequence every minute. The third team member, notified the surveyors that the 1-

minute observation period in one sector had expired and that it was time to begin observation of the next sector. The third team member, also entered the data, as reported by the observers, on the whales sighted and other related information on special record cards. The observers and the recorder, changed roles periodically.

The observers conducted their observations standing up, and to make it easier to fix the binoculars in a stable position, they were attached to wooden support posts matching the observers' heights (Figure 8). The azimuths to the whales observed were determined using the built-in compass of the binoculars in degrees from the zero point of the magnetic pole. The vertical angle to the animals relative to the horizon (the declination angle) was determined using the reticle scale of the binoculars with an accuracy to 0.1 reticles. The number of reticles was counted from the horizon line to the whale or the base of the spout), and the distance to the animal was then computed accordingly.

To minimize the time between surveys in adjacent sectors from neighboring observation stations, thus reducing the probability of double counting moving whales, the scanning direction at the observation stations was changed depending upon the direction in which the teams were moving on their routes. For example, the scan started from the north sector when they moved from north to south and from the south sector when they moved from south to north. This methodology was adopted at the beginning of September, based on feedback from field scientists. Prior to this, the scanning direction was north to south irrespective of which way the team was traveling.

The time of the start and end of scanning of the water area from the specific observation station, the observers' and recorder's initials, the metocean conditions, the exact time gray whales and other cetaceans were sighted, the number of individuals in the group, the direction of movement, features of their behavior, the presence of cows with calves, the presence of ships in the water area, etc., were recorded in the prescribed form (Table 2) on standard survey data record cards (Table 3); details not covered in the record columns were entered in a note.

Upon completion of each survey, all data collected was entered into a computer (in Microsoft Excel worksheets) and backed up on compact discs. During the season, the surveys were also cross-checked with the behavioral team to ensure survey accuracy.

2.1.3.4 Whale Coordinate Calculation

To determine the geographic coordinates of the gray whales observed in the surveys and other objects on the sea surface, it is necessary first to calculate their distances from the observation station. During the initial phase, the angles corresponding to each reticle division of the optical system of the Fujinon binoculars were determined.

After repeated calibration (i.e., experimental checking of accuracy in determining the distance to an object using different formulas) during the field season, the appropriate formula given by Lerzak and Hobbs (1998) was recognized as the most accurate, and the distances from the observation stations to the whales were calculated using this formula below:

$$\alpha = \arctan\left(\sqrt{2hR_E + h^2}/R_E\right) \cong \sqrt{2hR_E + h^2}/R_E$$

$$\beta = \frac{\pi}{2} - \alpha - \theta$$

$$H = \alpha R_E \cong \sqrt{2hR_E}$$

$$D_0 = (R_E + h)\cos(U\beta W) - \sqrt{(R_E + h)^2\cos(\beta)^2 - (2hR_E + h^2)}$$

$$\delta = \arcsin\left(\sin(\beta)\frac{D_0}{R_E}\right) \cong \sin(\beta)\frac{D_0}{R_E}$$

$$D = \delta R_E \cong \sqrt{D_0^2 - h^2}.$$

where: α = angle between a horizontal line (90°) and the horizon, β = angle between the observation station and the target object, δ = arc between the observation station and the target object, θ – angle between the horizon and the target object, h – elevation of the observation station, R_E – radius of the Earth $\left(6.371\times10^6 \text{ m}\right)$, D_0 = straight-line distance to the object and D = distance between the observation station and the target object on the Earth's surface.

A correction of the height of the observer (1 m 70 cm), was added to the elevation of each observation station (h). Using these computed distances from the observation stations to the whales, the coordinates of the animals observed in the surveys were determined according to formulas developed by LGL Limited.

Latitude = Asin (Cos (azimuth) × Sin (distance ÷ (1852 × 60)) × Cos (latitude of OS location) + Sin (latitude of OS location) × Cos (distance ÷ (1852 × 60)))

Longitude = longitude of OS location + Acos(**[** Cos (distance ÷ (1852 × 60)) – Sin (longitude of OS location) × Sin (longitude of whale location point) **]** ÷ **[** Cos (longitude of OS location) × Cos (longitude of whale location point) **]**).

Finally, the (perpendicular) distance between the locations of gray whales or other objects and the shoreline of the island was determined as follows:

For each observation station, the direction of a line perpendicular to the shoreline was calculated. Since the shoreline in the survey area in northeastern Sakhalin generally runs from northnorthwest to southsoutheast, the angle of the perpendicular was determined by the formula:

$$\alpha = \frac{(\alpha_C + \alpha_{IO}) - 360°}{2}$$

where α = directional angle of the perpendicular to the shore, α_N = azimuth of the shoreline to the north and α_S = azimuth of the shoreline to the south. Then the perpendicular distance of the whale or other survey object from shore was calculated by the following formula:

$$d = L \times cos\ (\alpha - \varphi),$$

where: d – the distance between the sighted object and the shore; L – the estimated distance to the sighted object; α – the directional angle of the perpendicular to the shore; φ – the azimuth to the sighted object.

Survey data obtained using this method may still contain double counted whales: however this method provides representative characteristics of the distribution and provides an index of abundance of whales in the near-shore Piltun Area.

2.1.3.5 Minimizing Impact on Whales

Since there is no known direct or indirect impact on western gray whales during visual surveys from shore, there are no issues of minimizing the effect of the surveys on the animals to consider.

2.1.3.6 Data Analysis

Analysis of the data obtained in 2004 during the course of the shore-based survey program in northeastern Sakhalin was performed primarily with MS Excel, ArcView and Statistica software.

In preparing mapping materials for each survey route, separate maps were produced, even if no whales were sighted, or if the route survey was interrupted due to weather conditions or other reasons. The ArcView program was used to plot all the maps.

In addition to the maps for each survey, summary maps were prepared with weekly and monthly data and data for the entire season. The signs indicating whales on the weekly maps used different colors for each survey conducted during the week, the monthly maps used different colors for the symbol for each week, and the composite map with data for the entire work season used different colors for the symbol for each month. The numbers indicating the numbers of whales in the groups were not included in the summary maps. Maps with data from sightings of cows with calves were prepared separately for each week and month and for the whole work season.

2.2 Survey Efforts

2.2.1 Aerial Surveys

Aerial surveys were conducted every month from early July through the second half of December (Table 4). Survey flights were made in the two feeding areas (Piltun and Offshore) on standard transects (Figure 2).

On 20 December, while conducting the last aerial survey, the formation of young ice (frazil), covering the entire water area visible from the survey altitude, was observed in the coastal waters of northeastern Sakhalin. The percentage of sea covered in ice varied from a rating of 6 at the shoreline to 9 far from shore. Therefore, only partial surveys could be conducted (transects 1 and 4 of the Piltun Area and transect 5 of the Offshore Area) but neither gray whales nor other cetaceans were observed.

2.2.1.1 Piltun Area

Full surveys on transects 1-4 in this area were conducted on 4 July, 31 July, 22 September, 19 October and 15 November. Flights on supplementary transects (5-8, - Figure 2) were conducted on 22-23 September and 19 October. A total of 17 full and partial aerial surveys were conducted in the Piltun Area in 2004. The results are given in Table 5.

2.2.1.2 Offshore Area

Due to variable weather and time constraints, this area could not be fully surveyed in one trip. Nevertheless, the water area of all transects (4 to 9) where gray whales had been observed most frequently in previous years was fully covered during all surveys except in November. A total of five surveys were conducted in the Offshore Area (the sixth survey, the December survey, had to be interrupted due to rapidly deteriorating weather). The survey results are given in Table 6.

2.2.2 Vessel Based Surveys

According to the original program, three full-scale vessel surveys of gray whales, involving observation of the Piltun and Offshore areas for two consecutive days (at the beginning, middle and end of the voyage), were planned for the work period of the research vessel *Akademik Oparin* off the northeast coast of Sakhalin (from July 30 to October 7). However, only one such survey sequence in the two feeding areas (17-18 August) was performed due to weather conditions, and on that survey, only 87% of the Offshore Area was inspected. However, there were two complete surveys of the Piltun Area and three in the Offshore Area. In addition to these surveys, a total of 760 hours was spent on opportunistic partial surveys and observations in the Piltun and Offshore areas during the expedition. Surveys were also conducted while the research vessel *Akademik Oparin* was en route to the work area from Vladivostok and back.

2.2.2.1 Piltun Area

Two full gray whale surveys on the complete planned survey transect were conducted there (7 and 17 August), and another eight incomplete surveys covering from 50 to 90% of the

transect were performed between 4 September and 1 October (Table 7). Combining the dedicated surveys in this area and the opportunistic observations, coastal feeding waters were inspected as far as the 30- to 40-m isobath.

2.2.2.2 Offshore Area

The area was inspected on several occasions in 2004, both during dedicated gray whale surveys conducted there on 18 and 22 August and 21 September, and when the research vessel *Akademik Oparin* entered these waters during benthos and acoustic studies (6, 20 and 30 September).

2.2.3 Shore-based surveys

2.2.3.1 Piltun Area

A total of 56 full route surveys of gray whales in the northern part of the Piltun Area (in the Odoptu-Piltun section) and 42 surveys in the southern part (the Astokh-Chayvo section) were conducted during the period of field work from 1 July to 27 October (Table 8). Problems with transportation vehicles at the start of the season and the aforementioned differences in survey conditions due to more intense wave conditions in the Southern area than in the Odoptu-Piltun section (most frequently in October) led to the difference in the numbers of surveys.

3.0 SURVEY RESULTS

3.1 Distribution and Abundance of Western Gray Whales

3.1.1 Piltun Area

3.1.1.1 Aerial Surveys

A total of 228 sightings of lone gray whales and groups of whales (total 294 individuals) were recorded in both feeding areas during the aerial survey period, including 231 animals within the zones of survey transects and 63 animals off-transect in the Piltun Area (Table 4). Information on the dates and coordinates of all gray whale sightings recorded in the Piltun Area in 2004 is given in Appendix 4.

Gray whales were observed in the Piltun Area during all surveys except in December (survey data and locations of sightings of the animals are given in Table 5 and Figure 9). The results show that the numbers of gray whales counted on transects 1-4 in the Piltun Area varied substantially from month to month (Table 5). The highest numbers in 2004 were observed during the late July survey (42 whales) and the last 10 days of September (49 whales), which significantly exceeded the numbers for other periods (14 whales in early July, 12 in the last 10-day period of October, and 11 in mid-November). It should be noted that these numbers are not estimates of the absolute number of gray whales spending the summer and fall of 2004 in the Piltun Area but are indices that characterize the seasonal dynamics of the whale population in these waters. It is valid to use these numbers in analyzing year-to-year changes in the numbers of gray whales concentrated in the coastal waters of northeastern Sakhalin when compared to data obtained in other years that was collected using similar procedures).

In 2004, aerial surveys indicated that the distribution of gray whales in the waters of the Piltun Area displayed considerable variability and changed substantially during the season (Figure 10). In early July, the majority of whales were observed in the central and southern part of this feeding area (near the mouth of Piltun Bay and approximately 40 km north of the bay). From late July – early August to the end of October, animals were observed primarily in the northern part of the area. In November, sightings were distributed more or less evenly along the entire coast in the survey area. It is interesting to note that during the aerial survey conducted on 19-25 October, there were no whales at all in the central part of the observation area (in a 16-kilometer segment of the coastal waters within minisectors 16 to 23, – Figures 10 and 11).

Most of the gray whales in the Piltun Area (90.1%), as observed in previous years, stayed within 4 km of shore, i.e., were recorded in flights on survey transects 1 and 2 (Table 5, Figure 9), as was observed in previous years (Blokhin et al. 2003, 2004). Despite some difference in the average numbers of whales recorded on each of these two transects (somewhat more were sighted on transect 2), the difference was not statistically significant (Figure 12).

3.1.1.2 Vessel Based Surveys

A total of 810 sightings of lone gray whales and groups of whales were recorded during vessel surveys and observations in the Piltun and Offshore areas; in addition, another nine species of marine mammals (Appendix 7) were sighted in these areas and on the route of the

vessel along the eastern shores of Sakhalin (en route from Vladivostok and back).Variation in the distribution of gray whales in the waters of the Piltun Area and substantial variations in their distribution during the field season were observed during vessel surveys in August-September 2004, as in the aerial surveys. While generally sighted widely along the coast (from N52°38' to N53°35'), gray whales congregated in the northern part of the observation waters (with an approximate concentration center in the area of N53°16'-53°18'). This congregating in the northern part of the feeding area was observed for the majority of the survey period (Figure 13). However, the distribution of whales was variable. For example, on 4 and 24 September, whales were sighted relatively evenly throughout the observation waters, while on 1 October most of the whales were concentrated in the south, near the mouth of Piltun Bay (Figure 14). The locations of gray whales varied noticeably in different sections of the Piltun Area, not only on different days but often in the course of a single day (Figure 15). This variation can be clearly seen using the example of the surveys of 11-14 September, when the same section of the water area was inspected twice, during the first half and the second half of the day (07:00h - 12:00h and 15:00h to 18:00h., respectively).

Most of the whales stayed within the 20-m isobath, located an average of 3-4 km from shore in the Piltun Area, in August and September. Approximately 20% of the gray whales observed in the Piltun Area were sighted at greater distances from shore – as much as 5-7 km and even 9 km – where the animals were feeding actively and exhibiting various forms of social interaction. Gray whale sightings at such distances from shore were more typical of the northern part of the Piltun Area, but were also occasionally observed in the southern part (Figure 13).

The maximum number of whales obtained in a survey conducted with the standard procedure throughout the near-shore feeding area was 61 animals, counted on 17 August. A few more animals (62-63) were recorded in surveys on 5, 8 and 14 September (Table 7), but those numbers cannot be regarded as indicators of the total gray whale population in the area, since the counts on those days were opportunistic observations made along with other work and did not follow the standard vessel survey protocols.

3.1.1.3 Shore-based surveys

During the 2004 season shore-based observers made a total of 4414 sightings of gray whales, of which 3518 were single animals (Appendices 8 and 9).

Detailed information on the gray whale distribution within the Piltun Area and the seasonal dynamics of the whale distribution from July to October was obtained in the course of shore-based surveys. Having confirmed in principle the general features of variations in the distribution of the animals identified in aerial and vessel survey work, the shore-based surveys provided a detailed picture of the seasonal dynamics and patterns of this process.

3.1.1.3.1 Spatial Distribution of Whales and Associated Seasonal Changes

The results of all shore-based surveys conducted in July-October 2004 are given in Table 9. For analysis of the overall distribution and abundance of gray whales on the scale of the entire Piltun Area, only data from complete surveys conducted simultaneously in the two sections were used. The results of partial surveys conducted only for individual sections of the Piltun Area were used as supplementary data to refine the specifics of the whale distribution during the season and in many cases provided substantial benefit in analyzing time periods in which full surveys could not be conducted.

The overall distribution of gray whales in the Piltun Area in July-October 2004 obtained from shore-based survey data is shown in Figure 16. The data illustrated in Figure 16 provides insight into the nature of the distribution of animals within the area during the period in which they were present in the Piltun Area, and the frequency of the whales' use of particular sections of the area. Figure 16 indicates that the Northern part of the feeding area was frequented heavily in 2004 and that a relatively high abundance was generally observed adjacent to the mouth of Piltun Bay. This is consistent with data from previous years. In the survey area south of the mouth Piltun Bay, fewer animals were observed during the survey period. Most of the sightings were of whales moving north in July or south at the end of September and early in early October. This may be due to the whales migration into and out of the Piltun Area at the beginning and end of the main feeding season.

The animals were relatively evenly distributed in the waters of the area from the mouth of Piltun Bay to the north end of Piltun Bar in July, with some degree of prevalence at approximately N53°15', in the area of survey station 5 (Figure 17-*July*). Some 67% of the whales were concentrated that month between N53°03' and N53°21' (from survey station 3 to station 11), and only about 13% of the animals stayed in the congregation at the mouth of the Bay (survey stations 15-20). In the Astokh-Chayvo section, in the southernmost part of the area

(in the segment from survey station 21 to station 24), the number of whales recorded amounted to 9% of total sightings (Table 10). Animals in the northern part of the area were typically located close to shore (< 4km), but also moved more than 4 km out to sea, beyond the 20-m isobath.

Two denser regions of whales were observed in the Piltun Area in August. Approximately 70% of whales were concentrated in the northern half of the Odoptu-Piltun section, (the nucleus of this aggregation was located between N53°06' and N53°21'). The second, considerably smaller congregation totaling about 17% of the animals, was formed opposite the mouth of Piltun Bay, approximately N52°50' (Figure 17-*August*, Table 10). The southern boundary of the northern congregation of whales was observed to be between survey stations 7 and 11 throughout August. An increase in the size of the grouping near the mouth of the bay was observed in August which did not appear to be the result of movement of whales there from the northern congregation, but was more likely due to the approach of animals from some other locations. In August, there were few whales south of survey station 21 (N52.44°.). In the northern grouping, the animals stayed at distances up to 6 km from shore in significant numbers, going beyond the 20-m isobath, as they had previously, in July.

The distribution of gray whales in the waters of the Piltun Area in September remained very similar to the August distribution – the larger northern congregation stayed within the same boundaries as in August and made up as much as 60-70% of the total number of animals present in the area. Beginning in mid-September, however, a certain overall shift northward could be seen, manifested in an increase in the number of whales in the zone of survey station 1. The congregation opposite the mouth of Piltun Bay became somewhat less clearly defined spatially and declined slightly in number, making up about 12% of the animals (Figure 17-*September*, Table. 10). There were few animals sighted south of survey station 21. A large number of whales from the northern congregation continued to stay in deep waters, beyond the 20-m isobath.

As in July, gray whales were dispersed fairly evenly throughout the waters of the Piltun Area again in October (Figure 17-*October*). Sightings in the north significantly decreased in number while the whales remaining were centered futher north, with approximately 22% of whales were recorded from survey stations 1-3 during this time. Overall, approximately 43% of the whales stayed in the northern part of the area (in the observation zone of survey stations 1-9) that month, and about 35% stayed in the central part (in the zone of stations 11-20) (Table 10).

As the northern congregation disbanded, the animals moved from relatively deep waters where they had stayed in large numbers in August-September and returned closer to shore. This decrease in whales observed in the northern part of the area in October corresponded to the reappearance of a significant number of animals in the southern part of the area (in the zone of survey stations 21-24), where their relative abundance increased compared to the two previous months and reached 22% (it was only 3% in August and 2% in September). The return of whales to the southern borders of the feeding area, where very few were observed at the peak of the feeding season (in August-September) may indicate the initiation of fall migration of the animals to their southern wintering grounds. It is also possible that the whales present there in July were late spring migrants. The change in distribution in October may also have been affected by the presence of vessels that were observed close to the feeding area. This is discussed further in section 3.7. There was also a certain amount of variation in the distribution of gray whales in the waters of the Piltun Area even within shorter time periods during the season (from one survey to the next) and in spatial terms (from one survey station to another), reflecting almost constant major or minor movements of animals within the feeding range (Figure 18). Such spatial and temporal variations were especially noticeable throughout the feeding area in July and October.

3.1.1.3.2 Distance from Shore and Depth

The comprehensive data set collected from shore in 2004 makes it possible to investigate the occurance of whale sightings as a function of distance from shore and water depth (Table 13). The majority of whales (about 90%) recorded in the Piltun Area in 2004 stayed within a 4-kilometer coastal zone during the feeding period. A significant proportion (approximately 20%) of the animals in the northern part of the area (in the zone of survey stations 1-5) were observed at distances of 4-6 km from shore, and occasionally individual animals were observed 6-8 km from shore. In the congregation in the immediate vicinity of the mouth of Piltun Bay (survey station 20), whales were not observed at distances greater than 4 km from shore, and many of the whales (37.4%) were observed within 1 km of the coast (Figure 19). It is unlikely that this was due to the lower sightability of whales at stations 13 and 15 due to their lower elevation (relative to station 5) as these observations are consistent with data that were collected from the high elevation point of the Piltun lighthouse in previous years (e.g. Weller et al., 2001, 2002).

Gray whale distribution from shore also varied somewhat during the season, and this variation was especially noticeable during the separate analysis of the distribution in the southern and northern parts of the area. In waters of the Odoptu-Piltun section, for example, the percentage of whale sightings in direct proximity to shore (within a 1-kilometer strip) increased steadily from July to October and decreased steadily between 1 and 2 km. No pronounced seasonal trends could be observed in the distribution of animals in waters farther from shore (Figure 20). In the Astokh-Chayvo section, more than half the gray whales observed in July-August stayed within 1 km from shore, while in September and October they were observed more frequency at greater distances from shore. As they gradually moved farther out – a preponderance of the animals in the waters of this section stayed in a zone from 1 to 2 km in September and from 2 to 3 km in October (Figure 20). The differences indicated above in the distribution of whales between sections may be due to the different sea bottom relief in the coastal waters of the sections (a relatively steeper increase in depth in the northern half of the area, and broad shallows in the southern part). No differences were established in the distribution of whales by distance from shore in waters of the Odoptu-Piltun section between morning and afternoon observations (Figure 21).

Distance from shore *per se* is probably not a key parameter determining the distribution of whales in most cases (with the probably exception of storm situations). Normally, since gray whales come to the shores of Sakhalin primarily for feeding, the distribution of whales should be associated mainly with the distribution of benthic and epibenthic food organisms, and that distribution, in turn, depends upon the specific hydrological and physical oceanographical conditions of the area. The depth of a whale at a given set of co-ordinates was estimated by first calculating the distance from shore and extrapolating this distance as a percentage of the distance between the shore line and the 20-m isobath. This relative position was then used to calculate depth assuming a constant gradual increase in depth from the coastline to the 20-m isobath. This calculation is only an approximation, and future analyses may be able to take into account the more complex bathymetry being developed by the acoustics team (Borisov et.al., 2005). Data on the distribution of whales as a function of sea depth for July-October is presented in Figure 22. Whales in the northern part of the feeding area (survey stations 1-9) in July were distributed in waters approximately 5 to 15 m deep, predominantly at depths greater than 8 m. At the northern edge of the area (survey stations 1-5), whales were also observed to form congregations at depths

in the area of the 20- and 25-m isobaths. Immediately north of the mouth of Piltun Bay (survey stations 11-15), the animals were concentrated mainly at minimal depths (<4 m), and at the southern edge of the area (opposite survey station 24), they were sighted most frequently at depths of 2 to 5 m.

The main concentration of whales in the depth zone from 8 to 15 m was even more clearly defined in the northern grouping (survey stations 1-9) in August, but a significant concentration of animals in the area of the 25-m isobath increased in size at the same time. Moreover, another congregation developed at depths of about 22 m, and a small group of whales appeared at depths of about 30 m. In the grouping that was located near the mouth of Piltun Bay (survey stations 11-15), most of the animals moved to somewhat greater depths (5-10 m) in August compared to July, and another additional concentration formed there closer to the 15-m isobath. Gray whales were not sighted farther south than station 20 in August.

The overall nature of the gray whale distribution by depths did not change fundamentally in September, and only the almost total absence of whale sightings at depths less than 5 m is noteworthy. However, some redistribution of whales occurred in the northern grouping, and some of them appear to have moved from the depth zone of 8-15 meters to the area of the 25-m isobath, where the concentration of animals clearly increased.

The distribution of whales by depth changed in October; with most of the whales again distributed at depths of 5 to 15 m, as in July. The whales also began appearing again in significant numbers in the southern part of the Piltun Area. At the northern edge (survey stations 1-3), the congregations in deep waters (20-30 m) that had occurred throughout the season dissipated, and the whales within this grouping that did not move south were redistributed closer to shore, at depths of 5-15 m. Congregations remained in the zone of 20- and 25-m isobaths only opposite survey stations 5-11, and these congregations were significantly smaller. Several concentrations formed near the mouth of Piltun Bay in the zone of 10- to 15-m isobaths. Similarly to observations in September, there was an absence of whale sightings in the shallowest waters (<5 m). It is not possible to judge the extent to which the changes in the gray whale distribution that took place in October were caused by natural processes and the degree to which they were associated with the possible impact of anthropogenic factors (e.g. the work of a seismic exploration vessel in the northern part of the Piltun Area during the first half of the month).

The gradient of the the seafloor out to the 20-m isobath is varied in the Piltun Area. In the northerns sections, the 20-m isobath is approximately 3 km from shore. However, as you move south, the 20-m isobath is further from shore, approximately 5 km from shore at the southern limits of the feeding area. Interestingly,the overall trend identified in the gray whale distribution in the Piltun Area indicates that the distance of the animals from shore decreases gradually from north to south. This observation may suggest a higher benthos and epibenthos biomass in the near-shore zone in the south.

Based on the analysis within the Piltun Area, the preferred waters for feeding by gray whales are those with depths of 5 to 15 m and that the abundance of animals in these waters was consistently high (70-75% of the total number of whales observed). The persistently high concentration of whales in the zones of the 20- and 25-m isobath observed in the northern part of the area in 2004, as well as the presence of whales in the zone of the 30-m isobath, is also noteworthy. This behavior may have been prompted by the presence of large accumulations of forage benthos, epibenthos, plankton and possibly of schools of small fish, on which gray whales perhaps can also feed (Darling et al., 1998; Nerini, 1984; Norris et al., 1983). In fact, Fadeev (2004) reports higher concentratons of sand lance and other food organsims in these locations in 2004 compared with 2003. It is also not excluded that the increase in the number of whales at greater depths (>20 m) recorded in northern waters in August-September might be due to their gradual consumption of the food resources in shallower waters. The lack of whale sightings in October at depths less than 4 m may have been the result of strong October swells in addition to the departure from shallow water of the current year's offspring and young whales that were frequently sighted at these depths earlier in the season (there was no recorded sighting of a whale < 1 year old after September 29). The results of the analysis of the gray whale distribution by depth are consolidated (with some degree of generalization) graphically in a schematic illustrated in Table 13. Blocks indicated in the table reflect the picture of the gray whale distribution by depth that developed in 2004 within the entire Piltun Area. The proportion of the animals that stayed at various depths naturally varied somewhat between the different parts of the area and in the course of the season, but the variation did not disrupt the overall distribution pattern that was established.

3.1.1.3.3 Stages of Seasonal Changes in the Whale Distribution

The shore-based surveys indicated the presence of subtle seasonal dynamics in the distribution of gray whales in the Piltun Area and significant changes in the movement of the animals and the spatial structure of the feeding grouping. It is therefore desirable to obtain more precise dating of the time boundaries between the phases identified in the seasonal-spatial dynamics. As it is impossible to accomplish this task on the basis of graphic and cartographic materials alone, further statistical analysis of the survey data was performed.

Current practices in considering the patterns of seasonal variations in the distribution or abundance of animals include using months or other calendar time periods. However, this method often is not entirely accurate in reflecting features of the variations in question, since phases in the development of intrapopulation distribution in practice do not coincide with the boundaries of calendar months. It is therefore impossible to establish the actual time periods of seasonal variations in the distribution of gray whales with this kind of standard approach.

Therefore, to accomplish the stated task, a correlation analysis was performed on the whale distribution (using latitudinal coordinates) using data from complete (i.e. days when surveys were conducted by both survey teams) shore-based surveys. A correlation table was obtained in which the correlation coefficient in each cell indicates the degree of similarity of the distribution of whales on the day in question to their distribution on all other days (Table 11). Positive coefficients (of some value) indicate the particular degree of similarity of those numbers, while negative coefficients indicate that the trend in the distribution on those days was opposite in nature. Highly significant correlations (0.8-1.0) are highlighted in dark blue, light blue and white. Less significant correlations (<0.8) are highlighted in red and orange, and negative correlations are highlighted in violet and lilac. This technique allows for blocks of days with more or less similar distributions of whales and periods in which the distribution was variable to be easily visually identified.

Days when the distribution of whales differed significantly in the short-term from all other days are represented in Table 11. Stormy weather was observed on 5-6 August but the reason for short-term effects observed on the other days (17 August and 6 and 11-13 September) is unknown. The clear prevalence of days with only slightly positive and negative correlation coefficients in July and October reflects the almost constant variations in the distribution of whales during those periods. This may be due to movement of the whales associated with their

spring-summer and autumn migrations. For example, the prevalence of days with a reverse correlation in October compared to the other months reflects the southward shift of the animals, which had already been observed directly in the course of the surveys and can be traced clearly in the daily charts.

If the days where short-term distribution deviated sharply from the typical distribution are excluded from the correlation table, it becomes evident that the distribution was fairly constant throughout the coastal waters from 26 July to 23 September. This is represented by the solid blue square in Table 12.

This extremely prolonged stability in the spatial distribution of the whale suggests that this period after arrival of the majority of whales has taken place, and before the initiation of the winter migration, corresponds to the main feeding season for gray whales in the Piltun Area for 2004. It should be noted, however, that during the periods from 15-25 July and from 17-23 September, due to weather conditions unfavorable for the surveys and various technical difficulties, no complete surveys could be conducted by both shore based teams. Partial surveys conducted in the Odoptu-Piltun and Astokh-Chayvo sections nevertheless indicated that the whale distribution during those days in July or September did not differ fundamentally from in the whale distribution that had been observed during the previous 10 day periods. It was decided on this basis to include 15-25 July into the pre-feeding phase, and 17-23 September into the feeding phase.

The period from 24 September through 29 September requires further consideration. As previously stated, the criteria for identifying a period of stable feeding distribution of whales was the high correlation coefficients between the whales' locations in the Piltun Area and other days in the same period and secondly the lack of migration indicators such as the presence of whales on the area's southern perimeter (in Zone UT Nos. 23 and 24). The last date when the whales' distribution was similar to other days of the main feeding period was 23 September. However, indications of potential return migration were only observed on 30 September, when the observers once again started sighting whales every day at the southern observation points (Table 9). The whale distribution between 24 September and 29 September did not correspond to the distribution in the feeding period and also changed daily.

Severe weather factors that could have had such a significant impact on the whales' distribution were also not observed during the six-day period. It may be that major whale movements in the Piltun Area on these days were related to vessel activity that began on 23 September in the northern part of the area*, but this is uncertain, and thus the reasons for the instability of the gray whales' distribution between 24 and 29 September remain unclear.

As correlation was used as the basic criterion for classifying certain parts of the season as feeding or non-feeding types, and this distribution was not similar or stable during this six-day period, it cannot formally be classified as a feeding phase. However, the whales' absence south of the recognized Piltun Area prior to 30 September suggests it more appropriate to classify this time period as the end of feeding phase, suggesting the main feeding phase lasted from 26 July to 29 September.

Subsequently, in order to identify the characteristic features and seasonal patterns of the gray whales' distribution in more detail, we conducted a comparative analysis of the resultant correlation table and the maps for each survey, the monthly maps of the whales' distribution in the Piltun Area over the entire period of observations, and additional diagrams and cartograms of seasonal variations in the whales' geographical locations (including their specific locations in terms of distance from shore and depth). We also analyzed all the data from the partial counts that were made only at the Odoptu-Piltun or Astokh-Chayvo sectors, which helped us to identify many details of importance for determining the general nature of the whales' distribution. As a result, we hypothesize that there are three functional phases of the whales' life cycle during their stay off the shores of Sakhalin identified on the basis of the correlation analysis using 2004 observations). These phases are the pre-feeding, feeding, and post-feeding phases and are distinguished by the following typical characteristics:

1st phase (5 July through 24 July): the period of completion of the migration of gray whales to the Piltun Area and the process of formation of the spatial structure of the feeding grouping, the key feature of which was considerable variability in the distribution of animals;

2nd phase (26 July through 29 September): the main feeding period, characterized by a stable distribution of animals, within which two stages can be distinguished:

- similar distribution of whales within congregations (26 July through 5 September);
- redistribution of animals within the congregations (7 September though 29 September);

* For more detail on this seismic survey see Section 3.7 "Potential Anthropogenic Effects"

3rd phase (starting 30 September): the initiation of the southward fall migration of the gray whales, accompanied by significant variability in distribution of animals.

The first phase. Daily variations in the distribution of animals, apparently due to the approach of new groups of whales, are typical of this phase (Table 11). During this period, whales were still sighted relatively evenly throughout the coastal waters, although a grouping of whales, still small but stable, had already formed in the northern part of the Odoptu-Piltun section (between about N53.24° and N53.28°, in the area of survey station 5) by 13 July. It is possible that this grouping was the nucleus of the future northern congregation (it can be seen clearly in the chart of the July distribution of whales – Figure 17). This grouping periodically moved a little, sometimes north and sometimes south, within the micro-sector in question, but it remained during all surveys in July. Another distinguishing feature of this phase was the almost constant presence of moving northward, south of the feeding range in the area of survey stations 23 and 24. No whales were sighted there subsequently until early October; only once (on 14 September) was a group of two gray whales observed from survey station 23, but this appears to have been a rare visit to the area.

Most of the whales during the first phase were distributed within the 15-m isobath in the waters of the Piltun Area with the majority of animals somewhat closer to shore, at depths of about 3 to 10 m, near the mouth of Piltun Bay. However, groups of whales were regularly observed in the northern part of the Odoptu-Piltun section (where the large northern congregation subsequently formed) staying 3-4 km or more from shore in the area of 20- and 25-m isobaths. The largest groups were more than 4 km from shore, at depths of approximately 25 m (Figure 23). Sea depths indicated in this report were determined by extrapolation from a bathymetric chart, hence some differences from actual depths at the points in question are possible.

The second phase (26 July–29 September) was characterized by the fairly constant distribution of gray whales (Table 12). The main feature was the constant presence of two relatively stable groupings of gray whales in the Piltun Area. The main group, which included up to 70% of the animals located within the coastal feeding area, occupied the northern half of the Odoptu-Piltun section (between about N53.11° and N53.34°, in the zone between survey station 3 and station 9). The second, much smaller group, was positioned opposite the mouth of Piltun

Bay, between N52.80° and N52.88° (the distribution of whales during this period is illustrated by maps for August and September - Figure 17).

Another notable characteristic of the distribution of gray whales throughout this phase was their almost total absence from the southern part of the Piltun Area. No whales were sighted south of N52.55° (survey station 23) during this period, and only 22 animals were observed south of N52.74° (i.e., the latitude of survey station 21).

The second phase (26 July – 29 September) comprised on two stages. During the first sub-stage (26 July-5 September), the whales in the group at the entrance to Piltun Bay stayed within 4-kilometers of the coast. In the northern grouping, as in July, they moved farther out to distances as great as 6 km from shore. The majority of whales preferred waters with depths of 10-15 m during this period, although most of the animals near the mouth of Piltun Bay were again recorded in shallows with depths of 5-10 m. In the northern grouping, where whales were generally observed all season to be in deeper waters than in the rest of the coastal feeding area, a significant number of whales regularly stayed in the area of the 25-m isobath, and some were observed in waters up to 30 m deep (Figure 24).

An increase in the number of whales in the northernmost part of the Piltun Area, near Odoptu Bay became noticeable during the first few days in September indicating a change in the distribution of animals and a transition of the feeding period to the next stage.

The second sub-stage of this phase (7-29 September) .The number of animals in the northern grouping at distances from shore greater than 4 km in the area of the 25-m isobath increased during this period, and some of the whales moved north of N53.35° (survey station 1). Opposite the mouth of Piltun Bay, the whales also began staying primarily in waters with depths of about 15 m (Figure 25). By the end of this phase, the borders of the northern and Piltun congregations had begun to merge, and the whales were observed to be more evenly distributed within the area.

September 6 is a special case. This date has a noticeable decrease in the number of whales compared to the day before and the day after (67 compared to 86-89 – Table 9). Although the reasons for the inconsistency are currently unclear, the whales were clearly in the middle of the feeding period and for the purposes of this anaysis the data from 6 September has been characterized as an outlier.

The third phase (beginning 30 September), appears to be the start of the gradual fall migration of the gray whales back to their wintering grounds. At the same time, a rather regular distribution of the animals throughout the coastal area became typical again, and there were no longer any observations of mothers with calves. The northern grouping dispersed with some of the whales moving north and closer to shore, where the majority stayed within 2 km of shore in waters with depths less than 15 m. Most whales moved south and somewhat farther out to sea (the nature of the whale distribution as a whole during this phase can be seen clearly in Figure 17-*October*). The number of whales opposite the mouth of Piltun Bay increased, and most of the animals were more than 1.5 km from shore, beyond the 10-m isobath. Groups of animals started to be recorded regularly at the southern survey stations during this period. An interesting feature of the period was the whales' avoiding depths less than 5 m (Figure 26), which possibly was due to quite strong October swells.

As stated previously, this period included observations of vessels including a seismic survey vessel near the Piltun Area. The unquantified nature of any potential anthropogenic effects on gray whales at this time and the intrinsic variability of whale distribution observed seasonally suggest that the dates given above for changes in functional phases in the Piltun Area have been established only for 2004, and it is quite possible that the dates may be somewhat different for other years (depending primarily on hydrometeorological conditions).

3.1.2 Offshore Area

3.1.2.1 Aerial Surveys

A total of nine sightings of lone gray whales and groups of whales (total – 12 individuals) were recorded during the aerial survey period in the Offshore Area, including seven animals within the zones of survey transects and five animals outside the survey zones. Information on the dates and coordinates of all gray whale sightings recorded in the Offshore Area in 2004 is given in Appendix 5. In addition to gray whales, some other cetacean species were also recorded during surveys in the Offshore Area; information on these sightings is given in Appendix 6.

Very few gray whales were observed during aerial survey work in the Offshore Area in 2004; however, the reasons for this are not yet clear. Although individual animals were observed there during almost all surveys, with the exception of November and December, the greatest number in one survey, recorded on 24 October, was only three whales (one whale was

tentatively assigned as a gray whale without complete certainty form the observer), and a total of only seven animals were sighted on transect during the five surveys between July and November (Table 6). Locations of gray whale sightings in the Offshore Area in 2004 are given in Figure 27 but due to the extremely small number of sightings, features of the distribution of whales there during the past season are not easily evaluated. One can note only that all the whales observed were sighted in the central part of the area (on transects 4 to 9), similar to observations in 2001-2003.

3.1.2.2 Vessel Based Surveys

Surveys from aboard the research vessel *Akademik Oparin* also indicated unusually low numbers of gray whales in the Offshore Area in 2004. No whales were sighted there in August during either the scheduled surveys (18 and 22 August) or the supplementary surveys conducting along with benthos studies (8, 14, 23 and 25 August), although the weather in the Offshore Area on those days was mainly sunny, with little wind, and was favorable for the surveys. Since a shift of a significant number of gray whales to the eastern part of the Offshore Area (to E142º57') outside the offshore survey grid was observed in 2003 (Maminov 2004), on the evening of 22 August 2004, upon completion of the survey work on the main transects, an additional supplementary longitudinal transect was run at E143º56' from N52°21' to N51°57'. However, no whales were observed there either.

On 6 and 20 September, during brief visits to the northern part of the Offshore Area for acoustic studies, the presence of small numbers of gray whales (three to five) was observed there on both days. On 21 September, during a dedicated survey in the Offshore Area on transects from N51°57' to N52°25', nine gray whales were recorded. The animals were distributed throughout the waters of the area but gravitated mainly toward the central and southern areas (Figure 28). During acoustic studies in the central part of the Offshore Area on 30 September, the survey area between N52°21' and N52°03' was examined opportunistically and 11 gray whales were counted there (Figure 28).

It is not possible to say anything definitive about the nature of the gray whale distribution in the Offshore Area in 2004. However, all the animals were observed in the central part of the area, as observed in the 2004 aerial surveys.

Both aerial and vessel surveys in 2004 indicate that the number of gray whales frequenting the Offshore Area has significantly decreased since 2001.

3.2 Group Size and Direction of Whales

3.2.1 Piltun Area

3.2.1.1 Aerial Surveys

Lone whales were recorded most frequently in aerial surveys in the Piltun Area (80.0%), followed by pairs (16.7%). Groups of three to six animals (from 0.4 to 1.6%) were low (Table 14). The average number of whales in a group was 1.26.

The majority of whales were headed either north or south when observed. However, the direction of movement of the animals was not constant throughout the survey period or in different survey areas (Table 15). In early July, for example, more whales were swimming southward when observed, while in late July and early August, the animals were more often observed swimming north. The northward movement of the whales became more pronounced in September-November. In addition, differences were observed in the direction of movement of the whales in different survey areas (Table 15). In the southern survey segments (from 1 to 3 – Figure 3), for example, animals swimming northward were prevalent (t=5.09), while in the northern part of the area (segments 4-6), this prevalence was less noticeable (t=1.08). Whales also were more frequently observed (t=3.68) swimming north in the evening (after 15:00h). Gray whales moving northward were prevalent in the Piltun Area during the season as a whole (t=4.83 (Figure 29).

3.2.1.2 Vessel Based Surveys

The average number of gray whales in groups in the Piltun Area during the period from early August to early October 2004, based on vessel survey data, was 1.39, with variations from 1.41 to 1.32 during different months. Lone whales were observed most frequently from the vessel (71.1%), groups of two whales were observed in 21.7% of the sightings (Table 16), and larger groups (three to six whales), as usual, were rarely observed (0.1 to 4.9% of the sightings). The proportions of lone whales and pairs – especially lone whales – varied only slightly between months. The proportion of other groups varied more sharply, possible as a result of an

insufficient sample size. It was not possible to identify the direction of whale movement during vessel surveys.

3.2.1.3 Shore-based surveys

According to data from shore-based surveys (based on an analysis of 2995 recorded observations of gray whales) in the Piltun Area during the period from July to October 2004, lone animals were observed most frequently (79.7% of the sightings), pairs averaged 17.1%, groups of three amounted to 2.5%, and larger groups (of 4-6 animals) were from 0.03 to 0.5% (Table 17). The average number of whales in groups for the observation period as a whole was 1.24. The proportion of lone whales hardly changed during the season, varying from 76.8% to 82.5%, while the proportion of groups of two to four animals was highest in August and then trended downward in September and October; it is difficult to judge the seasonal dynamics of the frequency of sightings of larger groups due to the extremely small number of such sightings.

The distribution of lone animals and pairs was consistent with the picture of the overall distribution of gray whales. This is expected given it is these two groups that total more than 96% of the whales recorded for the season and essentially make up the Piltun feeding grouping.

Groups consisting of three or more animals were sighted throughout the feeding area from all stations in July; three such groups were observed simultaneously opposite survey station five on 5 July. These groups of three animals were limited mainly to the main congregations of whales and were rarely observed outside the congregations until early September. A substantial redistribution of these groups occurred after 6 September: of the 27 groups of three counted in the feeding grouping during this period, 24 stayed north of survey station 9, and more than a third of them were observed north of survey station 3. Their distribution there precisely matched the overall nature of the distribution of whales in the northern grouping. 50% of the whales were concentrated far from shore, near the 25-m isobath, where they formed dense congregations, and 50% occupied a range of depths less than 15 m, where they were distributed more or less evenly in the coastal waters. Beginning in early October, groups of three whales began to be sighted again in all parts of the area. Calves were observed in six such groups during the season.

Practically all the groups of four animals were sighted in the northern part of the area, and only one of them was observed south of the mouth of Piltun Bay, on 13 July, moving north rapidly. The formation of such groups was more characteristic of the northern congregation; only

four such groups were sighted outside that congregation, and all of them were sighted before the middle of August. Trends in the dynamics of the spatial distribution of groups of four whales followed similar trends for the overall feeding grouping. In late September, for example, the majority of such groups (six of seven recorded after September 6) had shifted northward into the area of survey stations 1-3 while moving closer to shore, and only one group was recorded south of station 11, on 9 October. The distribution of these groups by distance from shore and depth, as in the case of groups of three, was consistent with the typical distribution for all whales of the northern congregation; calves were observed in three of these groups.

All the groups of five animals were recorded within the northern congregation, at distances of 1.5 to 5.5 km from shore and depths of approximately 15 to 30 m. The first such group was recorded on 17 August, and the other three were recorded during the period of September 8 to 16. No calves were observed in these groups.

The only group of six animals was sighted on 6 September opposite survey station 3 at a distance of about 1300 m from shore and a depth of about 12 m. This group included a cow with a calf.

3.2.2 Offshore Area

In partial and full vessel surveys in the Offshore Area in September 2004, a total of 21 gray whale sightings were fixed, of which 14 were lone animals (66.7%) and 7 sightings (33.5%) were pairs.

Of the 11 whales observed during aerial surveys, seven were single animals (77.8 %) and four were in two pairs (22.2 %).

3.3 Distribution of Cows with Calves

It is currently thought that all gray whale cows that come to the shores of northeastern Sakhalin with suckling calves to feed stay exclusively in the shallows of the Piltun Area during the summer and early fall (until the cows have finished nursing their calves). The absence of cow/calf pair observations in the Offshore Area in 2004 is consistent with the observations from the aerial and vessel survey data in 2001 – 2003, supporting this hypothesis. Therefore, the distribution of mother/calf pairs is considered hereafter only in the Piltun Area.

3.3.1 Aerial Surveys

No gray whale cows accompanied by suckling calves were observed during the aerial survey work in 2004. It should be noted that no aerial survey was conducted in the second half of August, and by 22-23 September, when the next survey was performed, the majority of mother/calf pairs may have already separated as a result of weaning of the calves.

3.3.2 Vessel Based Surveys

During vessel surveys in the Piltun Area from aboard the research vessel *Akademik Oparin*, 5 sightings of mother/calf pairs were recorded on 17, 19 and 26 August and 12 September (two sightings in one day). All the cows with calves observed in August were immediately adjacent to the shoreline near the mouth of Piltun Bay or north of it, at points N52°50', N52°51' and N53°03'. The mother/calf pairs in September were observed approximately 1-1.5 km from shore, one at N53°06' and the other at N53°14'. In one case (17 August), a calf was accompanied by two adult whales simultaneously. The Photo-ID team identified two unique pairs of cows with calves in 2004 (Yakovlev and Tyurneva, 2005).

3.3.3 Shore-based surveys

During the period of the shore-based surveys, 62 sightings of mother-calf pairs were recorded in the waters of the Piltun Area. There were eight sightings of such pairs recorded in July and 27 sightings each in August and September. Cows with calves were unevenly distributed in the waters of the area and were concentrated mainly in two locations – more than half of them (58.1%) stayed in the waters adjacent to the mouth of Piltun Bay, while 27.4% stayed in the area of survey stations 5 and 7 (Figure 30). They were sighted less frequency outside these areas.

The first cow accompanied by a calf in the Piltun Area was observed on 6 July, and the last four such pairs were observed on 16 September. The greatest number of cows with suckling calves – six pairs in a single full survey – was recorded in the feeding area on 10 September; five such pairs were recorded on 6 August.

Mother-calf pairs generally stayed close to shore. About 33% of them were recorded within a 500-meter coastal zone, and 56% were recorded within 1 km from shore. The frequency

of sightings of such pairs decreases steadily as the distance out to sea increases, and none were sighted more than 3 km from shore (Figure 31). Analysis of the data collected on the depths of waters where cows with calves were observed indicated that in most cases they stayed at depths of 5 to 15 m (maximum 17 m), with a significant prevalence in the depth range of 5-7 meters, especially in the zone of the 5-m isobath (Figure 32). Mother-calf pairs were observed in a number of cases in direct proximity to the water's edge, at depths of 1-3 m. It is interesting that sightings of cows with calves at such shallow depths in most cases coincided exactly with low tide ($r = 0.7$) and almost never occurred during high tide ($r = - 0.9$).

Mother-calf pairs began to separate during the third ten-day period in August. The first lone young whale born in the current year observed separately from its mother was reliably recorded on August 26. The process of breaking up of the pairs was most intensively observed in the middle of the first ten-day period of September, and calves separated from their mothers were observed regularly in the Piltun Area thereafter. The period of the transition of calves to life on their own, judging by shore-based survey data, ended at about the middle of the second ten-day period in September. No mother calf pairs were seen after 15 September. No more young whales born in the current year were sighted in the Piltun Area after 29 September.

3.4 Feeding Activity

The most reliable information on gray whale's feeding activity on benthic organisms is provided by aerial observations. Characteristic mud plumes left by the animals on the sea surface are clearly visible during aerial surveys. Since such data are less obtainable from vessel or shore based surveys, the data presented below on the feeding activity of the animals are based on aerial surveys only.

Analysis of mud plume data revealed that the feeding activity index in the Piltun Area varied by month and by sections within the survey waters in 2004. It was highest for whales observed between late July and the last ten days in September, i.e., during the period of the highest whale population in the feeding area, and was lowest in early July, October and November; the difference was statistically significant ($p=0.05$ – Figure 33). Some differences in whale feeding activity indicators have also been observed between segments of the survey waters (Figure 2): they were greatest for animals feeding in segments 1-3 and least for animals feeding in segments 4-5, although the difference was not statistically significant ($p=0.05$ – Figure 34).

In surveys of the Offshore Area, a mud plume was observed next to only one gray whale. The presence of another whale was identified only by a mud plume in the water. The feeding activity index for the animals there (n=7) was 0.29.

3.5 Whale Population Estimate

Shore-based surveys of gray whales in the Piltun Area conducted in July-October 2004 indicated that the overall population in the area stayed at a level during the summer-fall period that was consistent with previous years. The final survey results (Table 18) attest that, based on averaged data, the number of whale sightings in coastal waters increased steadily from July to September (from 57 to 90 sightings), which apparently reflected the arrival of new animals in the feeding area. However, the number dropped again in October, since the gradual migration of whales from Sakhalin waters to their wintering grounds began during that month. The peak numbers for each survey month do not quite coincide with the average numbers with the peak number of whale sightings for 2004 lower in August, and the number of animals that month approximately equal to the number in September. It is difficult to say which data – average or peak – more accurately reflect the seasonal dynamics of the gray whale population, and it will probably be most accurate given our data to consider the peak population period in the Piltun Area during the past season was in August-September.

It should be noted that the total whale count varied not only during each month but sometimes in the course of a few consecutive days (Table 9). This may be partly explained by the almost constant changes in weather conditions, which affected the survey conditions and often rendered reliable counts of the animals substantially more difficult, and by temporal and spatial changes in food availability.

The shore-based survey methodology is not designed to make conclusions concerning the absolute total number of gray whales present in the Piltun Area during the summer-fall period. The methodology of shore-based route surveys intrinsically may include double counts, and missed whales that are underwater for longer than the survey time for a specific area being monitored. Nevertheless, while it is difficult to assign an estimate with confidence, there is sufficient evidence to assert that the overall number of gray whales of the Okhotsk-Korean

population feeding in the coastal waters of northeastern Sakhalin has at least remained stable in recent years with no signs of decrease.

3.6 Sightings of Other Marine Mammals

Piltun Area. In the course of aerial surveys of the waters of this area in 2004, three Minke whales (*Balaenoptera acutorastrata*), a group of four killer whales (*Orcinus orca*) and one large whale of undetermined species were observed in addition to gray whales (Figure 35a).

During vessel-based surveys in the area, 67 sightings of Minke whales, mostly alone (74 animals, including 60 lone whales and seven pairs) (Figure 35b), 66 sightings of the common harbor porpoise (*Phocoena phocoena*), mostly alone (54%) or in pairs (25%)(and one sighting of a group of 12 (a total of 121 animals), and one adult male killer whale were recorded in addition to the gray whales. Minke whale and the harbor porpoise were sighted throughout the area but most frequently near the mouth of Piltun Bay, especially in August; the killer whale was observed in the northern part of the area (Figure 35a). Of the pinnipeds, the ringed seal (*Pusa hispida*), spotted seal (*Phoca largha*) and bearded seal (*Erignathus barbatus*) were recorded in the Piltun Area in 2004. A total of 59 sightings of these species (84) animals were recorded, and an overwhelming majority (84%) were ringed seals observed both near the coast of the island and at distances up to 10 km from shore (Figure 35d).

In the process of shore-based surveys in the Piltun Area, of cetacean species other than the gray whale, only Minke whales (34 sightings, 38 animals) and common harbor porpoises (80 sightings, 175 animals) were observed (Figure 35c), along with one sighting of a pair of beaked whales (family *Ziphiidae*), the species of which could not be established exactly, and one sighting of a dolphin of undetermined species (Attachments 8 and 9). Minke whales were generally sighted alone (78.9% of the sightings) at a considerable distance from shore, and their relative concentration was higher in the northern part of the area than the southern. Common harbor porpoises were sighted more or less evenly throughout the near-shore zone, but overall more of them were observed in the waters of the Astokh-Chayvo section, which was apparently due to the presence of broad shallows there, which this species normally prefers (Figure 35c). Harbor porpoises did not form any large congregations (the highest number of animals in groups of harbor porpoises was seven). Killer whales were occasionally observed in waters near the mouth of Piltun Bay, potentially associated with the presence of seals in the vicinity.

In the Offshore Area, in addition to gray whales, eight Minke whales and one large whale of undetermined species were observed in aerial surveys in 2004 (Figure 35a).

Minke whales (two sightings, three animals), common harbor porpoises (five sightings, 12 animals) and one group of three killer whales, including an adult male and a calf, were recorded in vessel-based surveys in the area (Figure 35b). Pinnipeds observed in the Offshore Area (in the central part) included only ringed seals, and they were rarely seen except in August (29 sightings, 34 animals), with just one animal sighted in September (Figure 35d).

Judging by vessel-based survey data, the frequency of sightings of Minke whales and common harbor porpoises in the waters of northeastern Sakhalin in August and September 2004 remained at the level of previous years, although killer whales were observed considerably less frequently.

The following species of marine mammals were also recorded during the passage of the research vessel, *Akademik Oparin,* from Vladivostok to its main work area and back along the east coast of Sakhalin and through the Sea of Japan: Minke whales (five animals), killer whales (19), common harbor and Dall's porpoises (*Phocoenoides dallii*) (11 and three, respectively), northern fur seals (*Calorhinus ursinus*) number 78 animals (near Tyulenii Island), ringed seals (2), spotted seals (4), a bearded seal (1) and 2 true seals of undetermined species (Appendix 7).

3.7 Potential Anthropogenic Effects

During the period of the shore-based surveys, a number of vessels of various size could be seen regularly in the waters of the Piltun Area at anchor or moving at different distances from shore, although no obvious impact on the gray whale distribution was observed. No fishing boats were observed in the Offshore Area in 2004.

A seismic exploration vessel was observed at the northern edge of the Piltun Area towards the end of September. This vessel was observed moving south from survey station 5 on 23 September; the next day (24 September), in the vessel was observed in the area of survey station 7. No surveys were performed on 25-26 September due to bad weather, and on 27 September it was possible to perform only a partial survey at the three northernmost stations, but the vessel was not present in the observation zone. The seismic exploration vessel was seen again on 28 September, 8-10 km from shore, and thereafter, until 12 October, it was observed in

every survey in waters between survey stations 1 and 7 cruising north or south at a distance of 3-4 km or more from the coast (on 11 October it passed closer to shore, within 2-3 km, near survey station 3).

Corresponding with the appearance of this vessel, changes were observed in the gray whale distribution especially in the northern part of the Piltun Area. First, in the vessel's operating area (survey stations 1-7) there was a redistribution of the animals in regard to distance from shore. Throughout the period in which the seismic exploration vessel was present in these waters (until 12 October), the whales were observed closer to shore, (Figure 36), mostly within the 2-kilometer zone (Figure 37 and 39). At the same time, south of the vessel's operating zone (in the area of survey stations 9-15), the pattern was opposite: the percentage of animals more than 2 km from shore even increased during the period from 23 September to 12 October compared to the preceding period (Figure 39).

Toward the end of September and beginning of October the number of whale sightings in the north area of the survey area also appeared to decrease, with a corresponding increase in sightings in the southern section of the feeding area.

In the first decade of October, the gray whale distribution in north part of the Piltun Area was variable with whales being observed primarily in the central and south parts of the feeding area as well as in its very north zone (Figure 18). This may in part of been due to avoidance of the vessels in the area. However this period also coincides with the onset of the fall migration so attributing changes of whale movement due to vessel traffic cannot be done with certainty.

Interestingly, whale sightings were recorded in every survey beginning 30 September on the southern periphery of the Piltun Area in the zone of survey stations 23-24. Unfortunately, bad weather made it impossible to conduct full surveys after the seismic and other vessels left the area, hence it was not possible to see whether whale sightings increased again in the north part of the Piltun Area. However, based on previous work this is unlikely given the annual fall migration of whales out of the Piltun Area.

4.0 DISCUSSION

The most surprising result of the combined program of gray whale surveys in the waters of Northeastern Sakhalin conducted in 2004 was the almost total absence of the animals from the Offshore Area, where a significant number of animals had been present on a regular basis

during the previous three years. In 2004, only 12 whales were observed on or off trasect during all aerial surveys and 28 sightings of gray whales were recorded from all vessel-based surveys. The highest numbers were not obtained until fall (in a vessel-based survey on 21 September (nine animals) and an aerial survey on 24 October (three animals). The highest numbers of gray whales recorded there in a single aerial survey in 2002-2003 were 12 and nine animals, respectively, (Blokhin et al., 2003, 2004), and 50 and 48 animals according to vessel-based survey data (Maminov 2003, 2004).

It is unknown what caused the almost total disappearance of gray whales from the Offshore Area in 2004. The hypothesis that negative changes in the food resources for gray whales in the Offshore Area is not supported by the results of benthos studies conducted at the same time within the scope of the program. This data suggests that the benthos biomass in the area was at similar and high levels in 2003 and 2004 (Fadeev, 2005).

The other notable point is the clearly increased number of whales in the Piltun Area in 2004. A maximum of 49 animals were counted there in aerial surveys, compared to 21-27 in 2002-2003 (Blokhin et al., 2003, 2004). The number of gray whales recorded in coastal waters also increased last year compared to the previous period according to vessel-based survey data. While the maximum number of animals observed there was 28 whales in 2002 and 47 in 2003 (Maminov, 2003, 2004), the maximum in 2004 was 61 whales. Unfortunately, it is quite difficult to compare data of shore-based surveys from 2003 and 2004 due to some differences in the methods for the work. It is worth noting however, that a maximum of 70 whale sightings (Melnikov and Starodymov, 2004) were counted in the near-shore area (in the Odoptu-Piltun section) in August-September 2003 compared to a maximum in 2004 of 122 sightings.

The data discussed in this report indicates that gray whales that previously fed in the Offshore Area did not abandon the waters of northeastern Sakhalin during the summer-fall period of 2004 but rather moved from the offshore to the near-shore waters. However, it is not yet clear what caused this redistribution. No signs of anthropogenic impact on the whales in the Offshore Area were observed as no fishing boats were observed there. The movement of animals to the Piltun Area was apparently conditioned by natural factors (potentially higher than normal and more accessible concentrations of food organisms in the Piltun Area that attracted the whales). This appears to be tentatively supported by the benthic studies, in which higher

concentrations of sand lance and other food resources were found in areas where whales were observed feeding (Fadeev 2005).

Photo identification data indicates that whales observed in the Offshore Area in 2003 did relocate to the Piltun Area in 2004. Of 34 whales photographed in the Offshore Area in 2003, 27 were sighted in the Piltun Area in 2004, while three were re-sighted in the Offshore Area, all three of which were observed in both areas in 2004 (Yakovlev and Tyurneva, 2005). Furthermore, of the 27 of 2003 offshore whales observed in the Piltun Area in 2004, the majority -- 24 whales -- were observed North of latitude N53^{o}05', while 11 whales were observed South of N53^{o}05', including 8 whales seen in both parts of the Piltun Area" (Yakovlev and Tyurneva, 2005).

The data presented here supports the hypothesis that the total gray whale population in the coastal waters of northeastern Sakhalin has remained at a stable level in recent years, and that there may have been a redistribution of the animals between feeding areas in 2004 due to undetermined circumstances. It is difficult to estimate the population based on distribution data obtained in 2004, however it is interesting to note that data from the concurrent Photo ID work has recorded a total of 121 individuals for 2002-2004 in the northeast Sakhalin waters (Yakovlev and Tyurneva, 2005).

Gray whales stayed within their normal latitudinal range in the Piltun Area during the 2004 feeding season. Generally, the waters they used to some extent during the summer-fall period stretched (based on the coordinates of whale sightings during aerial and shore-based surveys) from about N52°40' in the south to N53°45' in the north. A comparison of the gray whale distribution in 2004 to similar data in previous years suggests that there have been no significant changes in the latitudinal limits of the Piltun Area in the last seven years. However, in 2004 there appeared to be more whales beyond the 20-m isobath than reported in previous years. In early August 1997, for example, whales were observed from N52°34' to N53°23' during a 3-day vessel-based survey (Würsig et al., 1999) (Figure 40). Based on E. I. Sobolevsky's (2000, 2001) helicopter survey data obtained during the summer and fall months (June-November) in 1999-2000, the distribution was similar to the data obtained in 2004. Only three times, on 9 October 1999, and 26 August 2000, were individual gray whales sighted farther north, at N53°33'53", N53°37'14" and N53°52'47"(Figures 41 and 42) than observed in 2004. There were no gray whale sightings outside these boundaries during aerial surveys in

2001-2003 (Blokhin et al., 2003, 2004) or shore-based surveys in 2003 (Melnikov and Starodymov, 2004).

There were also no visible changes in the overall nature of the distribution of animals in the waters of the feeding area – the majority of whales, as observed previously, stayed within a 4-kilometer coastal zone. The constant presence of a significant number of whales in the northern half of the area and a characteristic rising trend in the concentration of whales there in autumn (or closer to autumn) discovered in 2003-2004 have also been inherent in the seasonal dynamics of the spatial distribution of whales in the Piltun Area for at least the last 7 years according to the limited data available. Würsig et al. (1999), for example, during the first days of August 1997, according to combined data of vessel-based and shore-based surveys (Figure 40), 39.0% of the 59 whales counted stayed in the area of the mouth of Piltun Bay, and 32.2% stayed north of N53°09' (i.e., midway between survey stations 7 and 9). The results of E. I. Sobolevsky's helicopter surveys conducted in 1999 and 2000 (Sobolevsky, 2000, 2001), although not very representative due to the small numbers of whales recorded and differences in survey methodology, suggest that gray whales were quite numerous in the northern part of the Piltun Area during those years. For example, in August of 1999 and 2000 the majority of sightings were concentrated in the central part (near the mouth of Piltun Bay and slightly north, as far as N53^{o}03'00" (i.e., the traverse of survey station 11) (Figures 41 and 42). In September, a heavier density of whales was observed in the northern half of the area (Figures 41 and 42). It is difficult to delineate the whale distribution by the data for October and November, but no clear trends can be observed in the figures. Based on the gray whale distribution plots for 2000. The whales appear to have been relatively evenly dispersed within the feeding area for most of the season (from July to September), but in October they formed a denser congregation in the northern part (Figure 42). However, care should be taken in overinterpreting Sobolevksy's data since consistent overflight protocols were not followed.

A plot with combined survey data for the Piltun Area from July-November 2002 (Blokhin et al., 2003) also indicates a generally even distribution of gray whales in the waters of the Piltun Area (Figure 43). Aerial surveys for 2003, however, clearly showed the presence of pronounced changes in the gray whale distribution from summer to fall (Figure 44) – in July-August they were concentrated mainly in the central part of the Piltun Area, not far from

the mouth of Piltun Bay, while in September-October there was a mass movement to the northern half of the area (Blokhin et al., 2004).

Shore-based surveys conducted in August-September 2003 yielded a more detailed picture of the seasonal variations in the gray whale distribution in the Piltun Area during the summer-fall season of that year (Melnikov and Starodymov, 2004). As the respective charts show (Figure 45)*, most of the whales stayed in the central section of the feeding waters at the mouth of Piltun Bay and somewhat north of there in August 2003, while a trend toward some increase in the abundance of animals in the northern part of the area and a decrease in the central part was observed in September. In October the whales were distributed relatively evenly through the coastal waters of the Odoptu-Piltun section, although there was still a somewhat elevated concentration at the northern edge (nothing is known, however, about the presence of whales in the waters of the Astokh-Chayvo section, where no shore-based surveys were conducted in 2003).

The main difference in the seasonal dynamics of gray whales in the Piltun Area between 2004 and previous years was formation of a large dense area of animals in the northern part of the area considerably earlier than normal. These animals were observed at 20-25 m water depth, which was also atypical of the Piltun Area compared to previous years. It is possible that the unusually large northern grouping could have formed due to an additional influx of animals that had been feeding mainly in the Offshore Area in previous years (this hypothosis is tentatively supported by Photo-ID data).

At present we have data from several years on the distribution of gray whales in this area during feeding season. These data indicate that the specific seasonal-spatial nature of the distribution of the animals in these waters varies from year to year. It seems probable that the gray whale distribution in feeding areas depends primarily on the abundance of food resources (benthic and epibenthic invertebrates) in the specific sections of the feeding area. Therefore, to answer the question of the specific causes of particular features of the distribution of animals it is best to consider patterns in whale distributions in light of distribution of food resources. The

* Since V. V. Melnikov and S. P. Starodymov calculated the coordinates of the observed gray whales according to a simplified formula, a recalculation had to be performed by the more precise formula (Lerzak and Hobbs, 1998) used for the purpose in 2004 (see section 2.1.3.4) to ensure that the procedures for determining the animals' positions matched, and the corrected data had to be applied to the same chart base as that on which all the whale distribution charts were plotted in this report.

benthos group working as part of the joint program has conducted studies of the composition and biomass of invertebrates in the areas where elevated concentrations of gray whales formed. It is interesting to note that Fadeev (2005) recorded increased concentrations of isopods in the northern part of the Piltun Area (adjacent to stations 1 – 7) (up to 80 g/m^2) compared with 2003 (< 10 g/m^2) (Fadeev, 2005).

Correlation analysis of seasonal variations in the spatial distribution of gray whales in the Piltun Area in 2004 revealed that the spring and summer migration of whales from their wintering grounds to the feeding waters off the northeast coast of Sakhalin appeared to end during the last ten days in July. For two months, until the end of September, the whale distribution in the coastal area, was relatively stable. Finally, at the end of September, the stable spatial structure that had developed for the feeding grouping began to undergo significant changes – the large congregations of whales in the northern parts of the Piltun Area dispersed more evenly throughout the near-shore zone. At this time, the whale distribution started a clear shift into the southern part of the area, which may be linked to the initial stage of their fall migration to their wintering grounds. The transition from the stable feeding distribution stage to the migration stage, accompanied by active movement of the animals, occurred quickly at the end of September in 2004. It is impossible to delineate an effect that any offshore seismic exploration work in the northern part of the feeding area in late September and the first 10 days of October played in this rapid transition. Further studies in this area will be necessary to establish the typical seasonal cycles in the distribution of the gray whales during the feeding season. However, it is likely that the use of the near-shore and Offshore areas and changes in distribution will depend on food resource distribution. This could well change from year to year.

The effectiveness of the gray whale feeding process itself is very difficult to assess and can be judged only indirectly, according to the presence of mud plumes on the sea surface next to surfacing animals. The highest values of the whale feeding activity index (the frequency of sightings of mud plumes next to whales) in the Piltun Area in 2004, which reached 0.32-0.44, were observed between late July and the second half of September and were many times higher than in early July, October and November (Figure 34). This data differs substantially from similar indices obtained in 2003, when the feeding activity indices, although they varied somewhat, stayed at a rather high level (0.33–0.45) throughout the season, from July to October

(Blokhin et al., 2004). It is also worth noting that in both 2003 and 2004, the number of whales with mud plumes near them recorded in the northern part of the area was lower than in the southern part. Furthermore, an overall decrease in the gray whale feeding activity index in the Piltun Area was recorded in 2004 compared to the previous 3 years (Figure 46).

It is important to consider, that gray whales can feed, including in Sakhalin waters, on epibenthic and plankton crustaceans, and even possibly schools of small fish (Norris et al., 1983; Nerini, 1984; Darling et al., 1998; Dunham et Duffus, 2001, 2002; Würsig et al., 2003). Hence the absence of mud plumes does not indicate that a whale is not presently feeding on objects that do not involve taking up muddy bottom sediment in its mouth (plumes serve as an index of the whales' feeding on benthos only). The decrease in the whale feeding activity index defined by mud plumes is therefore not objective evidence that whales were actually feeding less aggressively in the Piltun Area in 2004 and in the northern part of these waters in particular. It is possible that the whales in the coastal waters in 2004 simply switched from benthos feeding to primary consumption of some other mass hydrobiont species present in abundance near the bottom or in the water column, or were in an area where materials they were feeding on would not show a mud plume. Our distribution data suggests that gray whales apparently feed on these species more frequently in the northern part of the area in general. This is supported by the high concentrations in the Piltun waters, and especially in the northern part, in 2004.

In conclusion, it is appropriate to discuss the issue of the accuracy and comparability of the survey results (aerial, vessel-based and shore-based surveys). A comparison of the results of aerial, vessel-based and shore-based surveys performed at the same time on the same day (and under similar weather conditions) is presented in Table 19.

Analysis of the data given in the table indicates that shore-based surveys produce significantly higher numbers of sightings than aerial or vessel-based surveys. Aerial and onshore surveys conducted on the same day indicate that aerial surveys sightings are on average 46.2% of the onshore sightings number. The significantly higher figures obtained during shore-based surveys in comparison to aerial survey data are not surprising, since the whales in Sakhalin waters dive for an average of more than 2 min (Gailey et al., 2004), and at an aircraft flight speed of about 200 km/h (i.e., more than 3 km/min), the airplane covers on average about 6.5 km while a whale is underwater and not visible. As a result, many of the animals are not observed. This problem is less significant from shore, thus the percentage of whales actually observed is

significantly higher (theoretically, given enough time, it would actually be possible to count all the whales present in the viewing area). The reason for substantial differences between vessel-based and shore-based survey results, however, is not entirely clear, since the speed of the vessel is substantially slower than the aircraft. It should be noted that aerial survey and vessel survey data are widely used and line transect methods are used to correct observed densities for whales that are missed during a survey.

Shore-based surveys of gray whales offer a cost-effective method for obtaining required information on the distribution and abundance of gray whales in the Piltun Area, because they can be conducted as often as the weather allows and, as a result, data series can be obtained over long periods of time.

The procedure for shore-based surveys on Sakhalin Island is currently being refined. In particular, there are often problems with reliable determination of the declination angle to the horizon for the points of whale sightings due to fog or haze that obscures the horizon, especially during the summer months, which can induce error in calculating the distance of the whales from shore and, accordingly, lower accuracy on the determination of their coordinates. The problem of undercounting of whales in scanning a water area is also yet to be resolved, since the whales stay under water for an average of more than 2 minutes, hence not all of them can be observed in a 1-minute scan of each 9-degree survey sector. The procedure for identifying whales counted twice in the boundary areas of adjacent survey stations also needs to be improved. However, the 2004 data provides representative characteristics of the distribution and abundance of whales in the near-shore area, and the information obtained, can be used to solve practical problems to minimize the impact of gray whales by the commercial development of the northeastern Sakhalin shelf.

5.0 CONCLUSIONS

The distribution surveys carried out during the summer-fall period in 2004 in the feeding area of grays whales of the Okhotsk-Korean (western) population off the northeast coast of Sakhalin, which included aerial, vessel-based and shore-based surveys, yielded extensive and detailed information on the distribution and abundance of the animals, as well as a number of other aspects of their biology. The most important and noteworthy results of the work are as follows:

1. As both aerial and vessel-based surveys have demonstrated, there were very few gray whales in the Offshore Area in 2004, where a significant number of animals had regularly been present during previous years. The maximum number of whales observed in the area in a single count was only three whales in aerial surveys and nine in vessel-based surveys (for comparison, the corresponding figures for 2002 and 2003 were nine and 12 whales and 48 and 50 whales, respectively).

2. In contrast, a significantly greater number of gray whales were observed in the near-shore Piltun Area in 2004 than in previous years. The maximum number recorded there increased from 27 to 49 compared to 2003 according to aerial survey data, from 47 to 63 according to vessel-based survey data, and from 70 to 122 according to shore-based survey data.

3. Comparison of the data presented makes it possible to conclude that gray whales that previously fed in the Offshore Area for some reason moved from there to the Piltun Area in 2004, although the cause of their redistribution is not yet clear. No signs of anthropogenic impact on the whales in the Offshore Area were observed, nor was their any deterioration in their food resources there compared to 2003. The shift of animals from there to the Piltun Area may be related to the presence of higher than normal concentrations of easily accessible food organisms in the Piltun Area (Fadeev, 2005).

4. Despite the significant changes in the gray whale distribution among feeding sectors observed during the summer-fall period in 2004, the total population in the waters off northeastern Sakhalin, from all survey methods remained approximately at the same level as in previous years.

5. Whales in the near-shore Piltun Area in 2004 generally stayed within the normal boundaries of their feeding range in these waters, which extends along the coast of the island from N52°25' to N53°25' (these boundaries have not changed significantly for at least the last seven years).

6. During the feeding season, the majority of gray whales (as many as 70%) in 2004 were concentrated in the northern part of the Piltun Area. An especially high concentration of the animals was observed there in August and September. This type of spatial distribution of whales in the Piltun Area was observed for the first time in recent years (previously the groupings in the northern half of the area only emerged during the autumn months).

7. The majority of gray whales (60 to 85%) in the waters of the Piltun Area, as observed in previous years, stayed within a 4-kilometer zone of the coastal shallows with depths of less than 15 m during the feeding season. However, congregations of animals as far as six or more kilometers from shore were also observed in the northern part of the area for almost the entire season, in unusually deep waters for the whales (20-25 and even 30 m), which had not been typical of the Piltun Area previously and may have been the result of the presence of high concentrations of feeding targets there in 2004.

8. The period of the spring and summer migration of gray whales to feeding grounds in the waters off northeastern Sakhalin in 2004, judging by the constant presence of animals moving north in the southern part of the Piltun Area, lasted until the last 10 days of July. Then the spatial structure of the feeding grouping preserved its stability for two months (until the end of September). In the southern part (south of the mouth of Piltun Bay), whales were sighted in relatively small numbers during these months. The fall migration to the wintering grounds appeared to begin near the end of September and the first 10 days of October in 2004, when sightings of the whales in the southernmost part of the area (at the latitude of Chayvo Bay) began again. The fall migration ends before the formation of ice (in a flyby on 20 December, when the sea near the coast was 90% covered with young ice, no gray whales were observed in the feeding areas).

9. Co-incidental with the presence of a seismic boat and support vessel being observed in the Piltun Area was a change in distribution pattern of gray whales. This redistribution could be also connected with the initiation of the annual migration south. It is currently not possible to delineate natural versus anthropogenic effects on distribution during this time period.

10. The maximum number of cows with the current years' calves observed in the Piltun Area in 2004 was up to six pairs (however, this may include double counts). This suggests that the birth rate in the Okhotsk-Korean gray whale population, insofar as can be judged from the survey data, has remained at the previous year's level (although one must keep in mind that the actual number of offspring in this population remains unknown, because it is impossible to assess how many calves died during the first six months of life in the wintering areas and on the long migration route to Sakhalin). All the cows with calves stayed in the shallows within 3 km of shore. The majority of cow-calf pairs were concentrated in the waters adjacent to the mouth of Piltun Bay and in the northern part of the area. As a rule, cows with calves stayed

in larger groupings and were sighted quite rarely outside the groupings. The breakup of "mother-calf" pairs and the transition of the calves to independent life was complete by 20 September.

11. The vast majority of gray whales in the waters of the Piltun Area, as in previous years, spent the entire season alone or in parts (about 75% and 20%, respectively); larger groups (three to six whales) were rarely sighted. The animals, as usual, moved north or south along the coast.

12. The feeding conditions for gray whales in the Piltun Area in 2004 (especially in the northern part of the area) were obviously favorable and may explain why few animals were observed in the Offshore Area.

In summary, observation of the whales present in the coastal waters off northeastern Sakhalin during the summer-fall period of 2004 was stable and currently no visible signs of a direct or indirect negative impact of production activity under the Sakhalin-1 and Sakhalin-2 projects on the western gray whale have been observed.

Studies of gray whales of the Okhotsk-Korean population in Sakhalin waters clearly should continue, since many aspects of their ecological cycle have not been studied adequately. The protection of this endangered population in the presence of overall intensification of commercial activity in the region is best served by developing specific, scientifically sound measures to mitigate potential impacts on the population of anthropogenic factors associated with this activity. Continued monitoring of the distribution and abundance of gray whales, will play a key role in the further accumulation of the biological information required for these purposes.

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TABLES

Table 1. Locations and characteristics of vehicle observation stations in 2004.

Section	OS Number*	Latitude	Longitude	Elevation above Sea Level (m)	Distance Between OS (km)	
Odoptu-Piltun Section	1	53.41249	143.15274	13.08	1-3	9.08
	3	53.33517	143.19597	18.13	3-5	8.25
	5	53.26345	143.22717	27.04	5-7	9.53
	7	53.17961	143.25584	14.56	7-9	6.15
	9	53.12498	143.27012	8.99	9-11	8.12
	11	53.05245	143.28461	7.95	11-13	8.77
	13	52.97434	143.30208	9.87	13-15	10.03
	15	52.88220	143.31976	5.9	15-20	5.6
Astokh-Chayvo section	20	52.83290	143.33437	5.29	20-21	9.6
	21	52.74653	143.32310	5.95	21-22	11
	22	52.64637	143.31812	7.73	22-23	9.8
	23	52.55821	143.31059	9.78	23-24	8.6
	24	52.48182	143.28970	10.8		

* - the observation station numbers in the Odoptu-Piltun section match the numbering in 2003 (the number of stations there was cut in half in 2004, and the previous stations with even numbers were not used).

Table 2. Land-based binocular surveys of gray whales: coding sheet instructions.

Part 1: Header Data Requirements

Line	Requirements
Station	Station Number (e.g., 22)
Observation Period	
Date: Year	Two digit code for year (e.g., 04)
Date: Month	Two digit code for month (e.g., June = 06)
Date: Day	Two digit code for day (e.g., 16)
Time: Start	Military Time (e.g., 0953 = 9:53 am)
Time: End	Military Time (e.g., 1442 = 2:42 pm)
Obs 1	Initials of Observer 1
Obs 2	Initials of Observer 2
DR	Initials of Data recorder
Observation Conditions	
Temp (°C)	Air Temperature in °C
Precip	Precipitation 00 = none; 01 = rain; 02 = fog; 03 = snow
Wind Direction	Wind direction in degrees magnetic
Wind Speed	Estimated wind speed (km)
Cloud Cover	Estimated cloud cover (%)
Visibility Distance	In km
Horizon Visible	1 = yes; 0 = no
Glare Present	1 = yes; 0 = no
Glare Angle	degrees magnetic
Swell	Estimated in metres
Sea State	Beaufort Scale

Part 2: Body Data Requirements

Line	Requirements
Station	Link to Station in Part 1
Date: Year	Two digit code for year (e.g., 04)
Date: Month	Two digit code for month (e.g., June = 06)
Date: Day	Two digit code for day (e.g., 16)
Time	Military Time of observation (e.g., 0953 = 9:53 am)
Obs	First and Last Initials of observer
Species	Two letter code (e.g., GW = Gray Whale; KW = Killer Whale)
Age	Adult = A; Subadult = S; C = Calf
Assumed Sex	F = Female (for cow/calf observations only)
Bearing	Magnetic bearing to whales (degrees magnetic)
Reticles below horizon	Maximum 0.5 reticles
Whale Activity	Traveling/moving: N =1; E = 2; S = 3; W = 4; Diving = 5; Motionless on surface = 6; Breaching = 7; other activities require other codes to be assigned as needed
Previously Counted	Enter 1 if yes; other wise leave blank
Distance from study Site	Estimated in km
Remarks	

Table 3. Data input form for completion during shore-based gray whale surveys in 2004.

STUDY AREA: PILTUN NORTH ☐ PILTUN SOUTH ☐																				
Part 1	**Observation Period**					**Observer and Data recorder**			**Observation Conditions**											
	Date			**Time**					**Temp (°C)**	**Precip**	**Wind Direction**	**Wind Speed**	**Cloud Cover**	**Visibility Distance**	**Horizon Visible**	**Glare Present**	**Glare angle**	**Swell**	**Sea State**
Station	Year	Month	Day	Start	End	**Obs 1**	**Obs 2**	**DR**											
REMARKS																			

Part 2	**Date**			**Time**	**Obs**	**Species**	**Count**	**Age**	**Sex**	**Bearing**	**Reticles below horizon**	**Whale Activity**	**Prev. Counted**	**Dist. From study site**	**Remarks**
Station	**Year**	**Month**	**Day**												

Table 4. Time periods of aerial survey work, time spent on surveys and results of surveys of gray whales off the northeastcoast of Sakhalin during July-December 2004.

Phase	Date	Time spent, hrs:min*	Number of gray whale groups sighted	Total whales counted	Whales on transects	
					Piltun Area	Offshore Area
1	Jul 1-5	6:35	30	37	39	2
2	Jul 27 – Aug 2	8:50	52	85	73	1
3	Sep 22-23	11:23	70	91	65	1
4	Oct 19-24	14:40	52	55	38	3
5	Nov 15-23	9:00	33	38	25	0
6	Dec 17-23	2:05	0	0	0	0
Total:		52:23	237	306	231	7

Note: ∗ - not including flights back and forth between Khabarovsk and Sakhalin.

Table 5. Results of aerial surveys of gray whales in the Piltun Area during July-December 2004.

Phase	Date	Transects								
		1	2	3	4	5	6	7	8	1-4
1	Jul 4	5 (6)	11 (11)							
1	Jul 4	0	8 (10)	2 (4)	4 (4)					14 (18)
2	Jul 31	20 (21)	19 (20)	2 (5)	1 (1)					42 (47)
2	Aug 1	13 (15)	18 (20)							
3	Sep 22	18 (27)	28 (30)	3 (6)	0	0	0			49 (63)
3	Sep 23		1 (3)					0	0	
3	Sep 24		15 (22)							
4	Oct 19	7 (11)	4 (4)	1 (1)	0	0		0	0	12 (16)
4	Oct 20	6 (7)								
4	Oct 21	1 (2)								
4	Oct 22	3 (3)								
4	Oct 22	7 (8)	2 (2)							
4	Oct 24	3 (3)	1 (1)							
4	Oct 25	1 (2)	1 (1)							
5	Nov 15	4 (6)	7 (9)	0 (2)	0 (0)					11 (17)
5	Nov 21	4 (5)	1 (1)							
5	Nov 23	4 (5)	5 (10)							
6	Dec 20	0			0					

Note: Numbers without parentheses are whales recorded within the survey zone of the transect (viewing angle 30-110%); numbers in parentheses are total whales observed during flight on the transect (both inside and outside the survey zone); empty cells indicate that no survey was performed on these transects.

Table 6. Results of aerial surveys of gray whales in the Offshore Area during July-December 2004.

Phase	Date	Transects											
		1	2	3	4	5	6	7	8	9	10	11	12
1	Jul 4	0		0	0	2 (2)	0	0	0	0			
2	Aug 1	0		0	0	0	0	0	0	1 (1)			
3	Sep 23			0	0 (2)	0	1 (1)	0	0	0	0	0	0
4	Oct 24			0	1 (1)	0 (2)	0	1 (1)	0	1 (1)			
5	Nov 21				0	0	0	0					
6	Dec 20					0							

Note: Numbers without parentheses are whales recorded within the survey zone of the transect (viewing angle 30-110%); numbers in parentheses are total whales observed during flight on the transect (both inside and outside the survey zone); empty cells indicate that no survey was performed on these transects.

Table 7. Conditions and Results of Gray Whale Vessel-based Survey in the Piltun Area in 2004.

Date	Coordinates Characteristics	52°40′-52°49′,9	52°50′-52°59′9	53°00′-53°09′,9	53°10′-53°19′,9	53°20′-53°29′,9	53°30′-53°35′,9	Total	% of planned transect
Aug 7	Survey time	13:00-14:00	12:00-12:53	9:11-11:59	8:02-9:10	7:30-8:01		7:30-14:00	100
	Visibility, km	7-10	10	10	6-10	5-6		5-10	
	Wave conditions, point rating	1	1-2	1	1	1		1-2	
	Number of whales and groups	3 (3)	6 (4)	2 (2)	20 (12)	3 (3)		34 (24)	
Aug 17	Survey time	12:26-13:20	13:28-15:16	15:21-16:08	16:15-17:10	17:16-18:14	18:16-18:46	12:26-18:46	108
	Visibility, km	10	10	10	10	10	10	10	
	Wave conditions, point rating	1	05-1	0.5	0.5-1	1	1	0.5-1	
	Number of whales and groups	2 (2)	9 (6)	9 (8)	25 (19)	14 (11)	2 (1)	61 (47)	
Sep 4	Survey time	15:03-18:00	13:01-15:02	12:17-13:00	11:00-12:16	8:21-11:03	7:00-8:20	07:00-18:00	90
	Visibility, km	10	10	10	10	10	10	10	
	Wave conditions, point rating	1-2	1	1	1	1	1	1-2	
	Number of whales and groups	-	19 (12)	5 (4)	18 (13)	7 (5)	-	49 (34)	
Sep 5	Survey time		11:49-13:04	13:04-15:55	15:56-19:00			11:49-19:00	50
	Visibility, km		10	10	10			10	

	Wave conditions, point rating		1	0.5-1	0.5-1			0.5-1	
	Number of whales and groups		6 (4)	19 (12)	38 (24)			63 (40)	
Sep 8	Survey time	09:00-11:40	11:42-14:44	14:45-15:42	15:43-16:45	16:46-17:44	17:45-18:00	09:00-18:00	87
	Visibility, km	10	10	10	10	1-6	10	1-10	
	Wave conditions, point rating	2	2	2	2	3-4	4	2-4	
	Number of whales and groups	1 (1)	11 (7)	14 (12)	31 (25)	5 (5)	-	62 (50)	
Sep 11	Survey time	19:10-19:30	18:15-19:10	17:26-18:14	16:36-17:25	14:35-16:35		14:35-19:30	71
	Visibility, km	10	10	10	10	10		10	
	Wave conditions, point rating	1	1	1	1	1		1	
	Number of whales and groups	3 (3)	8 (6)	5 (4)	16 (9)	17 (11)		49 (33)	
Sep 14	Survey time		19:09-20:00	18:19-19:08	16:48-18:18	16:48		16:48-20:00	51
	Visibility, km		10	10	10	10		10	
	Wave conditions, point rating		1	1	1	1		1	
	Number of whales and groups		14 (11)	8 (8)	34 (26)	6 (4)		62 (49)	
Sep 18	Survey time		15:25-17:00	14:35-15:24	10:41-14:34	9:27-10:40	9:00-9:26	9:00-17:00	78
	Visibility, km		6-10	6	8-10	6	6	6-10	
	Wave conditions, point rating		1-3	2-3	1-2	3	3	1-3	

	Number of whales and groups		8 (3)	7 (3)	24 (15)	2 (2)	-	41 (23)	
Sep 24	Survey time	15:25-16:00	14:27-15:24	13:16-14:26	12:26-13:15	8:16-12:25	8:00-8:16	8:00-16:00	78
	Visibility, km	10	10	10	10	10	10		
	Wave conditions, point rating	3	3	3	2-3	1-2	1		
	Number of whales and groups	-	9 (7)	12 (8)	15 (14)	21 (20)	-	57 (49)	
Oct 1	Survey time		8:00-10:14	10:15-12:41	12:42-14:37	14:38-16:30	16:31-18:00	8:00-18:00	65
	Visibility, km		10	10	10	10	10	10	
	Wave conditions, point rating		1	1	1	1	1	1	
	Number of whales and groups		16 (12)	8 (6)	4 (3)	8 (5)	2 (1)	38 (27)	

Table 8. Time spent on shore-based surveys of gray whales in the Piltun Area in July-October 2004.

Month	Odoptu-Piltun Section (Observation stations 1-15)				Astokh-Chayvo Section (Observation stations 20-24)			
	Full survey		Partial survey		Full survey		Partial survey	
	n	time	n	time	n	Time	n	time
July	16	42:40	2	0:40	7	11:40	1	1:40
August	14	37:20	2	1:40	13	21:40		
September	16	42:40	5	4:20	15	25:00		
October	10	26:40	2	3	7	11:40		
Total:	56	149:20	11	9:40	42	70	1	1:40

Table 9. Results of shore-based surveys of gray whales in the Piltun Area in July-October 2004.

Date	Observation Station													Total
	1	3	5	7	9	11	13	15	20	21	22	23	24	
JULY														
5	2	2			12	11	7	1	5	2	0	1	1	
6	0	3			8	12	8	5	6	0	0	0	0	
7	0	7	9	7	6	1	2	2						
8	0	1	1	3	1	17	17	6						
9	1	0	0	1	4	7	13	13						
10	1	10	8	1	9	1	0	0						
11	7	15	3	6	7	10	4	4						
12	1	3	4	1	4	7	10	2	6	6	1	0	0	45
13	6	5	6	9	6	9	4	4	1	0	0	7	8	65
14	0	3	5	6	3	2	6	6	4	0	0	0	1	36
15	0	5	20	10	5	10	4	4						
16			4					10						
17														
18														
19														
20	3	8	18	4	2	7	1	0						
21	8	1	8	6	9	5	4	4						
22														
23														
24										7	0	0	1	
25	1	11	14	25	15	10	6	6						
26	7	18	15	22	9	4	2	5	2	3	0	0	0	87
27	6	10	9	7	7	5								
28														
29														
30														
31	0	4	18	4	8	4	6	3	3	0	2	0	0	52
AUGUST														
1	12	16	15	10	14	3	5	3	7	0	0	0	0	85
2	4	11	25	10	2	1	2	3	3	3	0	0	0	64
3	10	9	13	14	7	1	2	1	5	2	0	0	0	64
4														
5														
6	1	7	17	15	6	2	10	13	19	2	3	0	0	95
7	3	10	17	10	4	0	2	1	8	0	1	0	0	56
8														
9														
10														
11														
12														
13	8	8	3	3	9	14	4	1						
14														
15		7	8						7	1	0	0	0	
16	3	8	12	7	7	6	8	6	4	1	0	0	0	62
17	5	7	9	12	3	1	3	13	14	0	0	0	0	67
18	0	15	15											
19														
20														

21														
22	0	19	30	25	12	2	1	16	16	1	0	0	0	122
23														
24														
25														
26														
27	2	6	5	13	16	3	2	1	3	4	0	0	0	55
28	6	13	20	16	5	6	2	0	6	0	0	0	0	74
29	2	11	4	9	15	11	1	3	4	4	0	0	0	64
30	1	18	13	13	13	10	7	7	5	3	2	0	0	92
31														
SEPTEMBER														
1														
2														
3														
4	2	10	12	15	8	11	14	5						
5	3	13	27	10	8	11	6	6	5	0	0	0	0	89
6	0	19	0	6	6	9	11	6	10	0	0	0	0	67
7	1	14	24	19	13	6	3	4	2	0	0	0	0	86
8	6	25	30	20	14	7	4	0						
9														
10	8	13	27	22	11	3	1	2	5	1	0	0	0	93
11	13	18	12	14	5	6	5	6	7	2	0	0	0	88
12														
13	15	26	16	6	3	2	3	7	9	6	4	0	0	97
14	13	21	25	10	2	5	9	9	6	4	2	0	0	106
15	5	15	17	17	15	12	8	5	8	0	0	0	0	102
16	3	21	39	34	8	2	4	5	2	0	0	0	0	118
17														
18	0	1	17	16	16	8	5	4						
19	9	11	25	30	19	10	3	2						
20														
21														
22	1	18	13	15					7	1	0	0	0	
23	8	23	20	11					5	1	0	0	0	
24	15	17	14	13	9	1	2	2	1	0	0	0	0	74
25														
26									5	0	0	0	0	
27	2	12	10											
28	5	7	7	1	1	1	4	4						
29	10	11	18	14	4	5	5	9	1	1	0	0	0	78
30	7	11	10						11	0	2	2	0	
OCTOBER														
1	6	9	2	3	1	4	4	10	12	6	1	1	1	60
2														
3														
4	7	9	12	8	5	3	2	5						
5	6	10	7	3	6	1	2	3	10	6	5	1	2	62
6	5	10	9	6	4	3	5	4	6	5	4	7	3	71
7	4	8	13	10	4	1	18	2	5	6	2	2	7	82
8	5	12	5	3	2	8	10	10	5	1	0	4	3	68
9	11	7	4	4	3	9	8	6	3	2	4	3	1	65
10	8	11	4	3	2	2	3	9						
11	11	5	3	2	1	0	3	7	5	0	1	8	9	55

12	7	3	4											
13														
14														
15														
16														
17														
18														
19	3	19	15	5	0	2								
20														
21														
22	0	7	0	6	1	0	2							

Table 10. Gray whale distribution by observation stations of the Piltun Area in July-October 2004 (based on full survey data). This is a new table, please use table below

Figures	Observation Stations													total
	1	**3**	**5**	**7**	**9**	**11**	**13**	**15**	**20**	**21**	**22**	**23**	**24**	
July (7 full surveys)														
Total number of whales	16	38	75	57	50	45	26	23	27	12	3	8	10	390
%	4.1	9.7	19.2	14.6	12.8	11.5	6.7	5.9	6.9	3.1	0.8	2.1	2.6	100
Average number of whales	2.3	5.4	10.7	8.1	7.1	6.4	3.7	3.3	3.9	1.7	0.4	1.1	1.4	57.0
August (12 full surveys)														
Total number of whales	49	135	180	154	104	46	45	67	94	20	6	0	0	900
%	5.4	15.0	20.0	17.2	11.6	5.1	5.0	7.4	10.4	2.2	0.7	0.0	0.0	100
Average number of whales	4.1	11.2	15.0	12.8	8.7	3.8	3.8	5.6	7.8	1.7	0.5	0.0	0.0	75.0
September (11 full surveys)														
Total number of whales	86	188	219	165	84	62	57	61	56	14	6	0	0	998
%	8.6	18.9	22.0	16.5	8.4	6.2	5.7	6.1	5.6	1.4	0.6	0.0	0.0	100
Average number of whales	7.8	17.1	19.9	15.0	7.6	5.6	5.2	5.5	5.1	1.3	0.5	0.0	0.0	90,7
October (7 full surveys)														
Total number of whales	48	61	43	31	21	26	50	42	46	26	17	26	26	463
%	10.4	13.2	9.3	6.7	4.5	5.6	10.8	9.1	9.9	5.6	3.7	5.6	5.6	100
Average number of whales	6.9	8.7	6.1	4.4	3.0	3.7	7.1	6.0	6.6	3.7	2.5	3.7	3.7	66.1

Table 11. Correlation table of seasonal variations in the gray whale distribution in the Piltun Area in 2004 (based on shore-based survey data).

Survey dates	7/5	7/6	7/12	7/13	7/14	7/26	7/31	8/1	8/2	8/3	8/6	8/7	8/16	8/17	8/22	8/27	8/28	8/29	8/30	9/5	9/6	9/7	9/10	9/11	9/13	9/14	9/15	9/16	9/24	10/1	10/5	10/6	10/7	10/8	10/9	10/11
7/5	1.0	1.0	0.4	0.6	0.9	0.7	0.9	0.5	0.9	0.8	0.7	0.9	1.0	0.4	0.8	0.8	0.7	0.8	0.7	0.9	-0.5	0.8	0.7	0.4	0.0	0.9	0.9	0.8	0.3	-0.1	0.8	-0.4	0.8	0.1	0.1	-0.5
7/6	1.0	1.0	0.4	0.8	1.0	0.5	0.8	0.3	0.8	0.6	0.5	0.8	0.9	0.3	0.7	0.7	0.6	0.7	0.4	0.8	-0.3	0.7	0.5	0.2	-0.6	0.7	0.8	0.6	0.1	-0.5	0.8	-0.6	0.8	-0.7	-0.4	-0.9
7/12	0.4	0.4	1.0	-0.3	0.5	-0.6	0.1	-0.8	-0.3	-0.5	0.3	0.2	0.1	-0.2	-0.2	-0.4	-0.5	-0.4	0.2	-0.2	0.4	-0.4	-0.6	-0.8	-0.3	0.2	-0.2	-0.5	-0.8	0.6	0.9	-0.7	0.6	0.7	0.5	-0.8
7/13	0.6	0.8	-0.3	1.0	0.7	0.8	0.7	0.8	0.8	0.8	0.0	0.5	0.9	0.0	0.6	0.8	0.8	0.9	0.3	0.8	-0.2	0.8	0.8	0.8	-0.1	0.5	0.9	0.8	0.7	-0.8	0.0	-0.1	0.5	-0.7	-0.2	-0.4
7/14	0.9	1.0	0.5	0.7	1.0	0.5	0.7	0.2	0.7	0.5	0.4	0.7	0.9	0.3	0.6	0.6	0.5	0.6	0.3	0.7	-0.2	0.6	0.4	0.1	-0.7	0.6	0.7	0.5	0.0	-0.4	0.8	-0.7	0.8	-0.6	-0.4	-0.9
7/26	0.7	0.5	-0.6	0.8	0.5	1.0	0.9	0.9	0.9	1.0	0.5	0.9	0.8	0.5	0.8	1.0	1.0	1.0	0.9	0.9	-0.7	1.0	1.0	0.9	0.3	1.0	0.9	1.0	0.8	-0.6	0.3	0.3	0.3	-1.0	-0.4	-0.1
7/31	0.9	0.8	0.1	0.7	0.7	0.9	1.0	0.8	1.0	1.0	0.7	1.0	0.9	0.5	0.9	1.0	1.0	1.0	0.8	1.0	-0.7	1.0	0.9	0.7	0.3	1.0	1.0	1.0	0.6	-0.1	0.7	0.0	0.6	-0.2	0.1	-0.5
8/1	0.5	0.3	-0.8	0.8	0.2	0.9	0.8	1.0	0.7	0.9	0.2	0.6	0.6	0.3	0.6	0.8	0.9	0.9	1.0	0.7	-0.5	0.8	1.0	1.0	0.6	0.9	0.8	0.9	1.0	-0.7	-0.1	0.6	0.2	-0.9	-0.1	0.1
8/2	0.9	0.8	-0.3	0.8	0.7	0.9	1.0	0.7	1.0	1.0	0.7	1.0	0.9	0.7	1.0	1.0	0.9	1.0	0.7	1.0	-0.8	1.0	0.9	0.7	0.0	1.0	1.0	1.0	0.6	-0.5	0.6	0.0	0.4	-0.9	-0.6	-0.4
8/3	0.8	0.6	-0.5	0.8	0.5	1.0	1.0	0.9	1.0	1.0	0.6	0.9	0.8	0.6	0.9	1.0	1.0	1.0	0.8	1.0	-0.8	1.0	1.0	0.8	0.3	1.0	0.9	1.0	0.8	-0.5	0.5	0.3	0.3	-1.0	-0.5	-0.2
8/6	0.7	0.5	0.3	0.0	0.4	0.5	0.7	0.2	0.7	0.6	1.0	0.8	0.4	1.0	0.9	0.7	0.5	0.5	0.4	0.7	-0.9	0.7	0.4	0.1	0.2	0.6	0.6	0.6	0.0	0.5	1.0	-0.1	0.2	0.2	-0.1	-0.4
8/7	0.9	0.8	0.2	0.5	0.7	0.9	1.0	0.6	1.0	0.9	0.8	1.0	0.9	0.7	1.0	1.0	0.9	0.9	0.7	1.0	-0.8	1.0	0.8	0.6	0.2	0.9	1.0	0.9	0.5	0.1	0.8	-0.1	0.6	0.0	0.1	-0.6
8/16	1.0	0.9	0.1	0.9	0.9	0.8	0.9	0.6	0.9	0.8	0.4	0.9	1.0	0.3	0.8	0.8	0.8	0.9	0.7	0.9	-0.4	0.8	0.7	0.5	-0.3	0.9	0.9	0.8	0.4	-0.7	0.6	-0.4	0.8	-0.9	-0.3	-0.7
8/17	0.4	0.3	-0.2	0.0	0.3	0.5	0.5	0.3	0.7	0.6	1.0	0.7	0.3	1.0	0.8	0.7	0.5	0.5	0.0	0.7	-1.0	0.7	0.4	0.1	0.0	0.5	0.5	0.6	0.1	0.3	1.0	0.1	-0.3	-0.4	-1.0	-0.1
8/22	0.8	0.7	-0.2	0.6	0.6	0.8	0.9	0.6	1.0	0.9	0.9	1.0	0.8	0.8	1.0	0.9	0.9	0.9	0.5	1.0	-0.9	0.9	0.8	0.5	0.0	0.8	0.9	0.9	0.4	-0.2	0.8	0.0	0.2	-0.8	-0.8	-0.4
8/27	0.8	0.7	-0.4	0.8	0.6	1.0	1.0	0.8	1.0	1.0	0.7	1.0	0.8	0.7	0.9	1.0	1.0	1.0	0.8	1.0	-0.8	1.0	0.9	0.7	0.2	1.0	1.0	1.0	0.7	-0.5	0.6	0.1	0.3	-0.9	-0.5	-0.3
8/28	0.7	0.6	-0.5	0.8	0.5	1.0	1.0	0.9	0.9	1.0	0.5	0.9	0.8	0.5	0.9	1.0	1.0	1.0	0.9	0.9	-0.7	1.0	1.0	0.9	0.3	1.0	0.9	1.0	0.8	-0.6	0.4	0.3	0.3	-1.0	-0.4	-0.2
8/29	0.8	0.7	-0.4	0.9	0.6	1.0	1.0	0.9	1.0	1.0	0.5	0.9	0.9	0.5	0.9	1.0	1.0	1.0	0.9	1.0	-0.6	1.0	1.0	0.8	0.2	1.0	1.0	1.0	0.7	-0.7	0.4	0.1	0.5	-1.0	-0.3	-0.3
8/30	0.7	0.4	0.2	0.3	0.3	0.9	0.8	1.0	0.7	0.8	0.4	0.7	0.7	0.0	0.5	0.8	0.9	0.9	1.0	0.7	-0.3	0.7	0.9	1.0	0.7	0.9	0.8	0.8	0.9	0.1	0.5	0.2	0.7	0.3	0.7	-0.3
9/5	0.9	0.8	-0.2	0.8	0.7	0.9	1.0	0.7	1.0	1.0	0.7	1.0	0.9	0.7	1.0	1.0	0.9	1.0	0.7	1.0	-0.8	1.0	0.9	0.6	0.0	1.0	1.0	1.0	0.6	-0.5	0.7	0.0	0.4	-0.9	-0.6	-0.4
9/6	-0.5	-0.3	0.4	-0.2	-0.2	-0.7	-0.7	-0.5	-0.8	-0.8	-0.9	-0.8	-0.4	-1.0	-0.9	-0.8	-0.7	-0.6	-0.3	-0.8	1.0	-0.8	-0.7	-0.4	-0.2	-0.6	-0.6	-0.7	-0.4	-0.1	-1.0	-0.3	0.2	0.6	0.9	0.0
9/7	0.8	0.7	-0.4	0.8	0.6	1.0	1.0	0.8	1.0	1.0	0.7	1.0	0.8	0.7	0.9	1.0	1.0	1.0	0.7	1.0	-0.8	1.0	0.9	0.7	0.1	1.0	1.0	1.0	0.7	-0.5	0.6	0.1	0.4	-0.9	-0.6	-0.3
9/10	0.7	0.5	-0.6	0.8	0.4	1.0	0.9	1.0	0.9	1.0	0.4	0.8	0.7	0.4	0.8	0.9	1.0	1.0	0.9	0.9	-0.7	0.9	1.0	0.9	0.4	1.0	0.9	1.0	0.9	-0.7	0.2	0.4	0.3	-1.0	-0.3	-0.1
9/11	0.4	0.2	-0.8	0.8	0.1	0.9	0.7	1.0	0.7	0.8	0.1	0.6	0.5	0.1	0.5	0.7	0.9	0.8	1.0	0.6	-0.4	0.7	0.9	1.0	0.7	0.8	0.7	0.8	1.0	-0.8	-0.2	0.6	0.2	-0.9	0.1	0.2
9/13	0.0	-0.6	-0.3	-0.1	-0.7	0.3	0.3	0.6	0.0	0.3	0.2	0.2	-0.3	0.0	0.0	0.2	0.3	0.2	0.7	0.0	-0.2	0.1	0.4	0.7	1.0	0.5	0.0	0.2	0.7	0.2	0.1	0.8	-0.1	0.3	0.6	0.5
9/14	0.9	0.7	0.2	0.5	0.6	1.0	1.0	0.9	1.0	1.0	0.6	0.9	0.9	0.5	0.8	1.0	1.0	1.0	0.9	1.0	-0.6	1.0	1.0	0.8	0.5	1.0	1.0	1.0	0.8	0.0	0.7	0.1	0.7	0.0	0.3	-0.5
9/15	0.9	0.8	-0.2	0.9	0.7	0.9	1.0	0.8	1.0	0.9	0.6	1.0	0.9	0.5	0.9	1.0	0.9	1.0	0.8	1.0	-0.6	1.0	0.9	0.7	0.0	1.0	1.0	1.0	0.6	-0.6	0.5	-0.1	0.6	-1.0	-0.4	-0.5
9/16	0.8	0.6	-0.5	0.8	0.5	1.0	1.0	0.9	1.0	1.0	0.6	0.9	0.8	0.6	0.9	1.0	1.0	1.0	0.8	1.0	-0.7	1.0	1.0	0.8	0.2	1.0	1.0	1.0	0.8	-0.6	0.4	0.2	0.4	-1.0	-0.4	-0.2
9/24	0.3	0.1	-0.8	0.7	0.0	0.8	0.6	1.0	0.6	0.8	0.0	0.5	0.4	0.1	0.4	0.7	0.8	0.7	0.9	0.6	-0.4	0.7	0.9	1.0	0.7	0.8	0.6	0.8	1.0	-0.7	-0.3	0.7	0.1	-0.8	0.1	0.3
10/1	-0.1	-0.5	0.6	-0.8	-0.4	-0.6	-0.1	-0.7	-0.5	-0.5	0.5	0.1	-0.7	0.3	-0.2	-0.5	-0.6	-0.7	0.1	-0.5	-0.1	-0.5	-0.7	-0.8	0.2	0.0	-0.6	-0.6	-0.7	1.0	0.6	0.0	-0.1	0.9	0.3	-0.1
10/5	0.8	0.8	0.9	0.0	0.8	0.3	0.7	-0.1	0.6	0.5	1.0	0.8	0.6	1.0	0.8	0.6	0.4	0.4	0.5	0.7	-1.0	0.6	0.2	-0.2	0.1	0.7	0.5	0.4	-0.3	0.6	1.0	-0.5	0.6	0.4	0.0	-0.8
10/6	-0.4	-0.6	-0.7	-0.1	-0.7	0.3	0.0	0.6	0.0	0.3	-0.1	-0.1	-0.4	0.1	0.0	0.1	0.3	0.1	0.2	0.0	-0.3	0.1	0.4	0.6	0.8	0.1	-0.1	0.2	0.7	0.0	-0.5	1.0	-0.5	-0.1	0.1	0.8
10/7	0.8	0.8	0.6	0.5	0.8	0.3	0.6	0.2	0.4	0.3	0.2	0.6	0.8	-0.3	0.2	0.3	0.3	0.5	0.7	0.4	0.2	0.4	0.3	0.2	-0.1	0.7	0.6	0.4	0.1	-0.1	0.6	-0.5	1.0	0.2	0.5	-0.9
10/8	0.1	-0.7	0.7	-0.7	-0.6	-1.0	-0.2	-0.9	-0.9	-1.0	0.2	0.0	-0.9	-0.4	-0.8	-0.9	-1.0	-1.0	0.3	-0.9	0.6	-0.9	-1.0	-0.9	0.3	0.0	-1.0	-1.0	-0.8	0.9	0.4	-0.1	0.2	1.0	0.7	0.1
10/9	0.1	-0.4	0.5	-0.2	-0.4	-0.4	0.1	-0.1	-0.6	-0.5	-0.1	0.1	-0.3	-1.0	-0.8	-0.5	-0.4	-0.3	0.7	-0.6	0.9	-0.6	-0.3	0.1	0.6	0.3	-0.4	-0.4	0.1	0.3	0.0	0.1	0.5	0.7	1.0	-0.1
10/11	-0.5	-0.9	-0.8	-0.4	-0.9	-0.1	-0.5	0.1	-0.4	-0.2	-0.4	-0.6	-0.7	-0.1	-0.4	-0.3	-0.2	-0.3	-0.3	-0.4	0.0	-0.3	-0.1	0.2	0.5	-0.5	-0.5	-0.2	0.3	-0.1	-0.8	0.8	-0.9	0.1	-0.1	1.0

Table 12. Correlation table of seasonal variations in the gray whale distribution in the Piltun Area in 2004 after excluding days with anomalous figures caused by stormy weather (based on shore-based survey data).

Survey dates	7/5	7/6	7/12	7/13	7/14	7/26	7/31	8/1	8/2	8/3	8/7	8/16	8/22	8/27	8/28	8/29	8/30	9/5	9/7	9/10	9/14	9/15	9/16	9/24	10/1	10/5	10/6	10/7	10/8	10/9	10/11
7/5	1,0	1,0	0,4	0,6	0,9	0,7	0,9	0,5	0,9	0,8	0,9	1,0	0,8	0,8	0,7	0,8	0,7	0,9	0,8	0,7	0,9	0,9	0,8	0,3	-0,1	0,8	-0,4	0,8	0,1	0,1	-0,5
7/6	1,0	1,0	0,4	0,8	1,0	0,5	0,8	0,3	0,8	0,6	0,8	0,9	0,7	0,7	0,6	0,7	0,4	0,8	0,7	0,5	0,7	0,8	0,6	0,1	-0,5	0,8	-0,6	0,8	-0,7	-0,4	-0,9
7/12	0,4	0,4	1,0	-0,3	0,5	-0,6	0,1	-0,8	-0,3	-0,5	0,2	0,1	-0,2	-0,4	-0,5	-0,4	0,2	-0,2	-0,4	-0,6	0,2	-0,2	-0,5	-0,8	0,6	0,9	-0,7	0,6	0,7	0,5	-0,8
7/13	0,6	0,8	-0,3	1,0	0,7	0,8	0,7	0,8	0,8	0,8	0,5	0,9	0,6	0,8	0,8	0,9	0,3	0,8	0,8	0,8	0,5	0,9	0,8	0,7	-0,8	0,0	-0,1	0,5	-0,7	-0,2	-0,4
7/14	0,9	1,0	0,5	0,7	1,0	0,5	0,7	0,2	0,7	0,5	0,7	0,9	0,6	0,6	0,5	0,6	0,3	0,7	0,6	0,4	0,6	0,7	0,5	0,0	-0,4	0,8	-0,7	0,8	-0,6	-0,4	-0,9
7/26	0,7	0,5	-0,6	0,8	0,5	1,0	0,9	0,9	0,9	1,0	0,9	0,8	0,8	1,0	1,0	1,0	0,9	0,9	1,0	1,0	1,0	0,9	1,0	0,8	-0,6	0,3	0,3	0,3	-1,0	-0,4	-0,1
7/31	0,9	0,8	0,1	0,7	0,7	0,9	1,0	0,8	1,0	1,0	1,0	0,9	0,9	1,0	1,0	1,0	0,8	1,0	1,0	0,9	1,0	1,0	1,0	0,6	-0,1	0,7	0,0	0,6	-0,2	0,1	-0,5
8/1	0,5	0,3	-0,8	0,8	0,2	0,9	0,8	1,0	0,7	0,9	0,6	0,6	0,6	0,8	0,9	0,9	1,0	0,7	0,8	1,0	0,9	0,8	0,9	1,0	-0,7	-0,1	0,6	0,2	-0,9	-0,1	0,1
8/2	0,9	0,8	-0,3	0,8	0,7	0,9	1,0	0,7	1,0	1,0	1,0	0,9	1,0	1,0	0,9	1,0	0,7	1,0	1,0	0,9	1,0	1,0	1,0	0,6	-0,5	0,6	0,0	0,4	-0,9	-0,6	-0,4
8/3	0,8	0,6	-0,5	0,8	0,5	1,0	1,0	0,9	1,0	1,0	0,9	0,8	0,9	1,0	1,0	1,0	0,8	1,0	1,0	1,0	1,0	0,9	1,0	0,8	-0,5	0,5	0,3	0,3	-1,0	-0,5	-0,2
8/7	0,9	0,8	0,2	0,5	0,7	0,9	1,0	0,6	1,0	0,9	1,0	0,9	1,0	1,0	0,9	0,9	0,7	1,0	1,0	0,8	0,9	1,0	0,9	0,5	0,1	0,8	-0,1	0,6	0,0	0,1	-0,6
8/16	1,0	0,9	0,1	0,9	0,9	0,8	0,9	0,6	0,9	0,8	0,9	1,0	0,8	0,8	0,8	0,9	0,7	0,9	0,8	0,7	0,9	0,9	0,8	0,4	-0,7	0,6	-0,4	0,8	-0,9	-0,3	-0,7
8/22	0,8	0,7	-0,2	0,6	0,6	0,8	0,9	0,6	1,0	0,9	1,0	0,8	1,0	0,9	0,9	0,9	0,5	1,0	0,9	0,8	0,8	0,9	0,9	0,4	-0,2	0,8	0,0	0,2	-0,8	-0,8	-0,4
8/27	0,8	0,7	-0,4	0,8	0,6	1,0	1,0	0,8	1,0	1,0	1,0	0,8	0,9	1,0	1,0	1,0	0,8	1,0	1,0	0,9	1,0	1,0	1,0	0,7	-0,5	0,6	0,1	0,3	-0,9	-0,5	-0,3
8/28	0,7	0,6	-0,5	0,8	0,5	1,0	1,0	0,9	0,9	1,0	0,9	0,8	0,9	1,0	1,0	1,0	0,9	0,9	1,0	1,0	1,0	0,9	1,0	0,8	-0,6	0,4	0,3	0,3	-1,0	-0,4	-0,2
8/29	0,8	0,7	-0,4	0,9	0,6	1,0	1,0	0,9	1,0	1,0	0,9	0,9	0,9	1,0	1,0	1,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0	0,7	-0,7	0,4	0,1	0,5	-1,0	-0,3	-0,3
8/30	0,7	0,4	0,2	0,3	0,3	0,9	0,8	1,0	0,7	0,8	0,7	0,7	0,5	0,8	0,9	0,9	1,0	0,7	0,7	0,9	0,9	0,8	0,8	0,9	0,1	0,5	0,2	0,7	0,3	0,7	-0,3
9/5	0,9	0,8	-0,2	0,8	0,7	0,9	1,0	0,7	1,0	1,0	1,0	0,9	1,0	1,0	0,9	1,0	0,7	1,0	1,0	0,9	1,0	1,0	1,0	0,6	-0,5	0,7	0,0	0,4	-0,9	-0,6	-0,4
9/7	0,8	0,7	-0,4	0,8	0,6	1,0	1,0	0,8	1,0	1,0	1,0	0,8	0,9	1,0	1,0	1,0	0,7	1,0	1,0	0,9	1,0	1,0	1,0	0,7	-0,5	0,6	0,1	0,4	-0,9	-0,6	-0,3
9/10	0,7	0,5	-0,6	0,8	0,4	1,0	0,9	1,0	0,9	1,0	0,8	0,7	0,8	0,9	1,0	1,0	0,9	0,9	0,9	1,0	1,0	0,9	1,0	0,9	-0,7	0,2	0,4	0,3	-1,0	-0,3	-0,1
9/14	0,9	0,7	0,2	0,5	0,6	1,0	1,0	0,9	1,0	1,0	0,9	0,9	0,8	1,0	1,0	1,0	0,9	1,0	1,0	1,0	1,0	1,0	1,0	0,8	0,0	0,7	0,1	0,7	0,0	0,3	-0,5
9/15	0,9	0,8	-0,2	0,9	0,7	0,9	1,0	0,8	1,0	0,9	1,0	0,9	0,9	1,0	0,9	1,0	0,8	1,0	1,0	0,9	1,0	1,0	1,0	0,6	-0,6	0,5	-0,1	0,6	-1,0	-0,4	-0,5
9/16	0,8	0,6	-0,5	0,8	0,5	1,0	1,0	0,9	1,0	1,0	0,9	0,8	0,9	1,0	1,0	1,0	0,8	1,0	1,0	1,0	1,0	1,0	1,0	0,8	-0,6	0,4	0,2	0,4	-1,0	-0,4	-0,2
9/24	0,3	0,1	-0,8	0,7	0,0	0,8	0,6	1,0	0,6	0,8	0,5	0,4	0,4	0,7	0,8	0,7	0,9	0,6	0,7	0,9	0,8	0,6	0,8	1,0	-0,7	-0,3	0,7	0,1	-0,8	0,1	0,3
10/1	-0,1	-0,5	0,6	-0,8	-0,4	-0,6	-0,1	-0,7	-0,5	-0,5	0,1	-0,7	-0,2	-0,5	-0,6	-0,7	0,1	-0,5	-0,5	-0,7	0,0	-0,6	-0,6	-0,7	1,0	0,6	0,0	-0,1	0,9	0,3	-0,1
10/5	0,8	0,8	0,9	0,0	0,8	0,3	0,7	-0,1	0,6	0,5	0,8	0,6	0,8	0,6	0,4	0,4	0,5	0,7	0,6	0,2	0,7	0,5	0,4	-0,3	0,6	1,0	-0,5	0,6	0,4	0,0	-0,8
10/6	-0,4	-0,6	-0,7	-0,1	-0,7	0,3	0,0	0,6	0,0	0,3	-0,1	-0,4	0,0	0,1	0,3	0,1	0,2	0,0	0,1	0,4	0,1	-0,1	0,2	0,7	0,0	-0,5	1,0	-0,5	-0,1	0,1	0,8
10/7	0,8	0,8	0,6	0,5	0,8	0,3	0,6	0,2	0,4	0,3	0,6	0,8	0,2	0,3	0,3	0,5	0,7	0,4	0,4	0,3	0,7	0,6	0,4	0,1	-0,1	0,6	-0,5	1,0	0,2	0,5	-0,9
10/8	0,1	-0,7	0,7	-0,7	-0,6	-1,0	-0,2	-0,9	-0,9	-1,0	0,0	-0,9	-0,8	-0,9	-1,0	-1,0	0,3	-0,9	-0,9	-1,0	0,0	-1,0	-1,0	-0,8	0,9	0,4	-0,1	0,2	1,0	0,7	0,1
10/9	0,1	-0,4	0,5	-0,2	-0,4	-0,4	0,1	-0,1	-0,6	-0,5	0,1	-0,3	-0,8	-0,5	-0,4	-0,3	0,7	-0,6	-0,6	-0,3	0,3	-0,4	-0,4	0,1	0,3	0,0	0,1	0,5	0,7	1,0	-0,1
10/11	-0,5	-0,9	-0,8	-0,4	-0,9	-0,1	-0,5	0,1	-0,4	-0,2	-0,6	-0,7	-0,4	-0,3	-0,2	-0,3	-0,3	-0,4	-0,3	-0,1	-0,5	-0,5	-0,2	0,3	-0,1	-0,8	0,8	-0,9	0,1	-0,1	1,0

Table 13. Gray whale distribution by depth in the Piltun Area in July-October 2004 (based on shore-based survey data).

Depths, *m*	Month				Season as a whole
	July	August	September	October	
0 – 4					
5 – 10					
11 – 15					
16 – 19					
20					
21					
22					
23 – 24					
25					
26 – 29					
30					
> 30					

Table 14. Numbers of gray whales in groups recorded in the Piltun Area during July-November 2004 (based on aerial survey data).

D a t e s	Numbers of whales in groups					
	1	2	3	4	5	6
Jul 4	25	6				
Jul 31 – Aug 1	38	13			2	1
Sep 22-24	54	12	3	1		
Oct 19-25	52	5				
Nov 15-23	27	5	1			
n	196	41	4	1	2	1
%	80.0	16.7	1.6	0.4	0.8	0.4

Table 15 Direction of movement of gray whales in the Piltun Area when observed during July-November 2004 (based on aerial survey data).

D a t e s	N	S	E	W	n
Jul 4	31.3	40.6	12.5	15.6	32
Jul 31 – Aug 1	50.0	39.3	7.1	3.6	56
Sep 22-24	72.1	20.9	4.7	2.3	43
Oct 19-25	63.0	29.6	3.7	3.7	27
Nov 15-23	66.7	19.0	9.5	4.8	21
Segments 1-3	58.4	26.5	8.8	6.2	113
Segments 4-5	50.0	40.3	4.8	4.8	62
Morning (9-12 a.m.)	41.3	41.3	8.8	8.8	80
Evening (3-6 p.m.)	59.3	25.9	11.1	3.7	54

Table 16. Numbers of gray whales in groups recorded in the Piltun Area from August 7 to October 1, 2004 (based on vessel survey data).

Numbers in Groups	Number of Sightings, %			
	August 7-17 n=177	September 4-24 n=631	October 1 n=38	Total n=845
1	69.5	71.6	70.3	71.1
2	22.0	21.2	27.0	21.7
3	6.2	4.6	2.7	4.9
4	2.3	2.2	-	2.1
5	-	0.2	-	0.1
6	-	0.2	-	0.1
Total:	100	100	100	100

Table 17. Numbers of gray whales in groups recorded in Piltun Area in July-October 2004 (based on shore-based survey data).

Group Size	Pods	%
1	2672	78.91
2	602	17.78
3	90	2.66
4	17	0.5
5	4	0.12
6	1	0.03
Total	3386	100

Table 18. Results of shore-based surveys of gray whales in the Piltun Area in July-October 2004.

	Number of Whales Counted				Total
	July	August	September	October	
Maximum	87	122	118	82	
Average	57.0	75.0	90.7	66.1	

Table 19. Comparative results of aerial, vessel-based and shore-based surveys of gray whales in the Piltun Area conducted on the same days in July-September 2004.

Date	Number of whales recorded			Remarks
	Aerial surveys*	Vessel-based surveys**	Shore-based surveys***	
Jul 31	**42** (1-4)	-	**52** (1-24)	
Aug 1	**31** (1-2)	-	**85** (1-24)	
Aug 7	-	**31** (100%)	**56** (1-24)	The vessel-based survey figure has been adjusted according to the total length of the shore-based survey route
Aug 17	-	**59** (108%)	**67** (1-24)	- " -
Sep 4	-	**49** (90%)	**77** (1-15)	No shore-based surveys were performed at survey stations 20-24, but no whales were sighted in their sectors from aboard ship; therefore, the vessel-based survey figure has been left unadjusted
Sep 5		**63** (50%)	**81** (1-24)	Shore-based survey data has been adjusted according to the vessel-based survey route (survey stations 3-15)
Sep 8		**61** (87%)	**106** (1-15)	Vessel-based survey data has been adjusted according to the total length of the shore-based survey route
Sep 11		**49** (71%)	**88** (1-24)	The vessel-based survey covered the zone of survey stations 1-21, but since no whales were observed in the shore-based survey from stations 22-24, the figure has been left unchanged
Sep 13		**40** (?)	**66** (1-24)	Shore-based survey data has been adjusted according to the vessel-based survey route (survey stations 3-15) 1-9
Sep 14		**62** (51%)	**87** 1-24	Shore-based survey data has been adjusted according to the vessel-based survey route (survey stations 3-20)
Sep 18		**40** (78%)	**67** 1-15	Vessel-based survey data has been adjusted according to the shore-based survey route
Sep 22	**26** (1-4)		**55** (1-7, 20-24)	Aerial survey data was adjusted according to the shore-based survey route
Sep 24		**57** (78%)	**74** (1-24)	Shore-based survey data has not been adjusted, since all the whales were sighted between survey stations 1-21, i.e., within the vessel's route
Oct 19	**10** (1-4)		**44** (1-11)	Shore-based survey was performed only at survey stations 1-11

* in parentheses – completed survey flight transects;
** in parentheses – percentage of scheduled survey transects actually covered;
*** in parentheses – numbers of survey stations from which survey was performed.

FIGURES

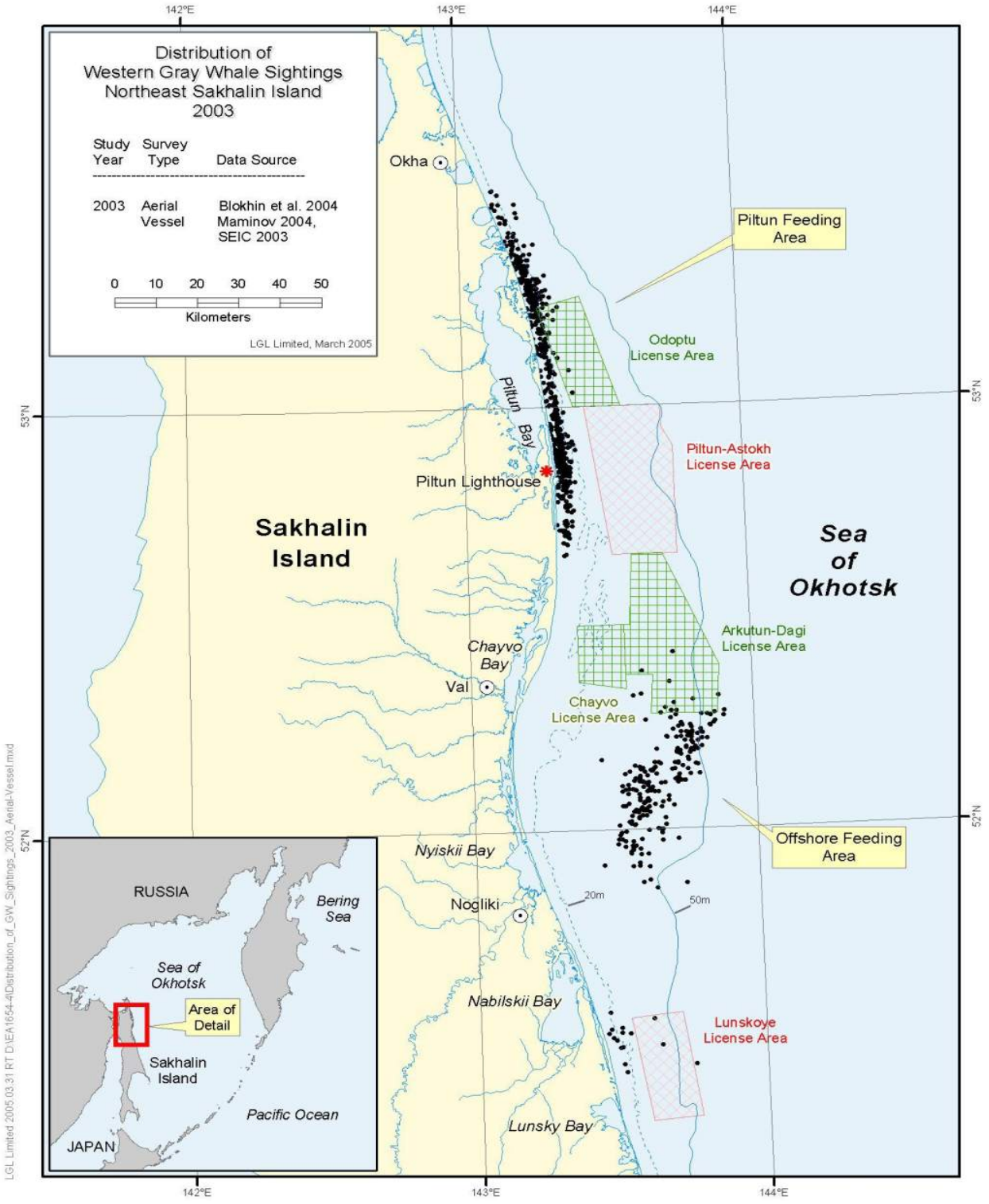


Figure 1. The license areas of the projects "Sakhalin - 1" and "Sakhalin - 2" and all sightings of gray whales using aerial and vessel based surveys in the the summer and fall of 2003.

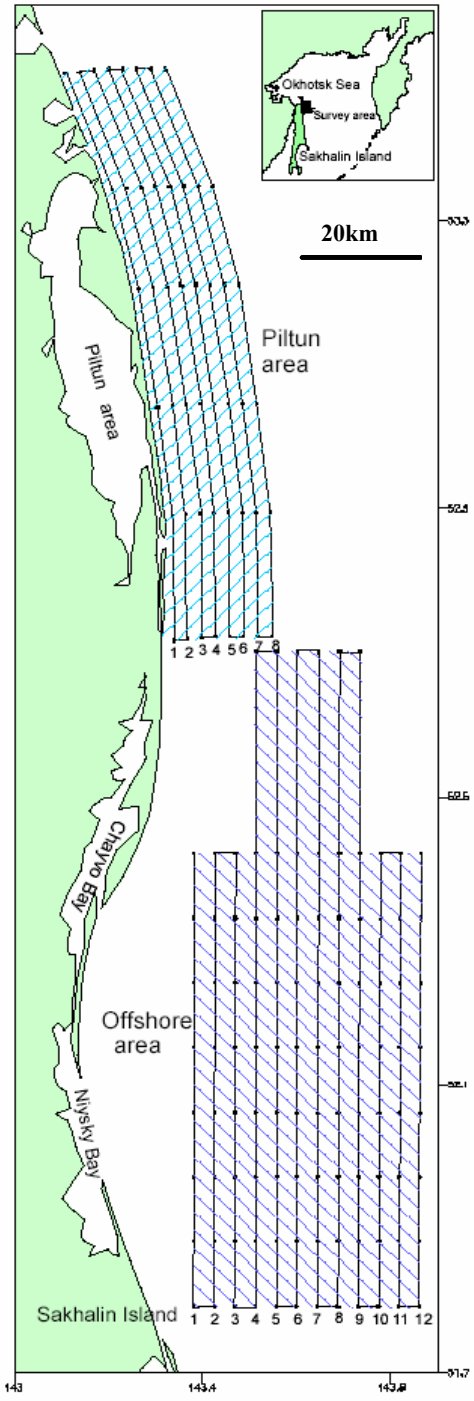


Figure 2. Flight transects of an An-28 aircraft during aerial observations off the northeast coast of Skhalin in 2004. Flight altitude: Piltun area - 300m, Offshore area - 500m, flight speed 180 -200 km/h.

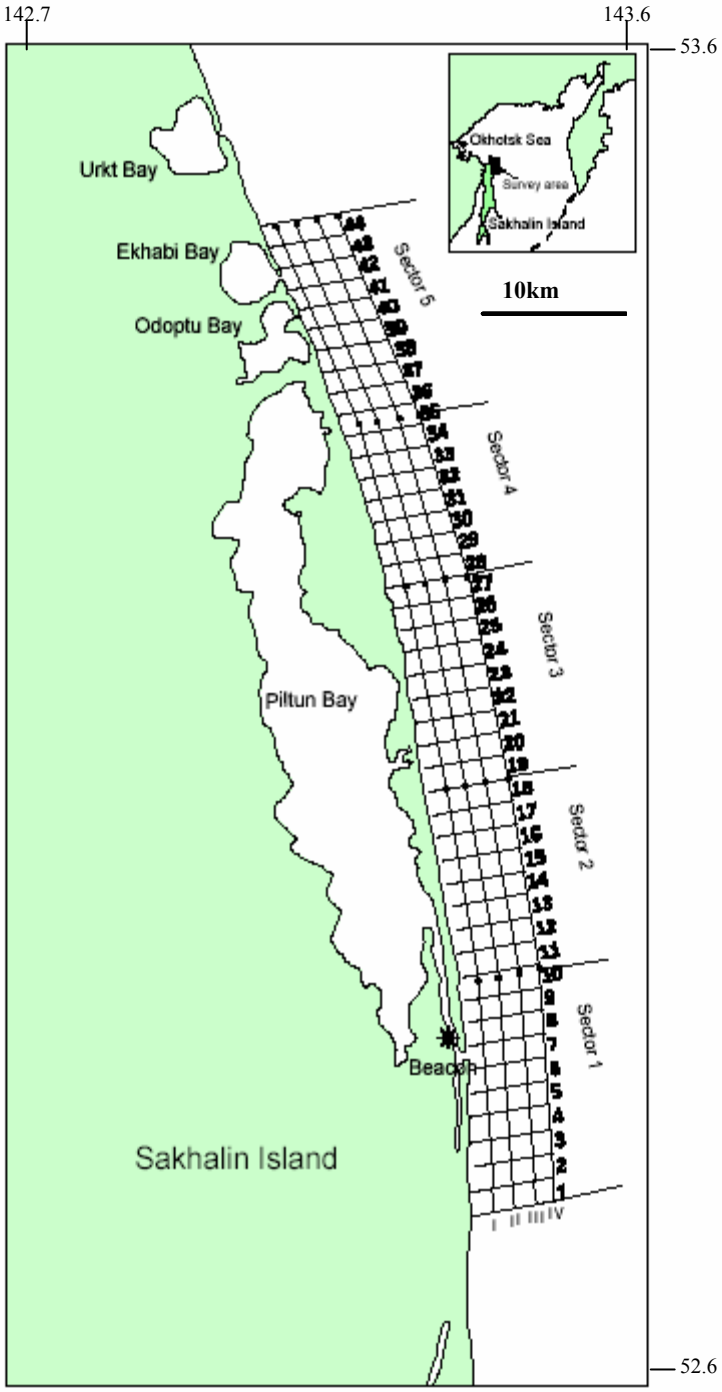
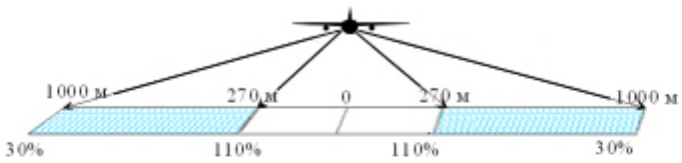


Figure 3. Diagram of sectors of Piltun area (Minisectors 1-44).

Flight Altitude 300m



Flight Altitude 500m

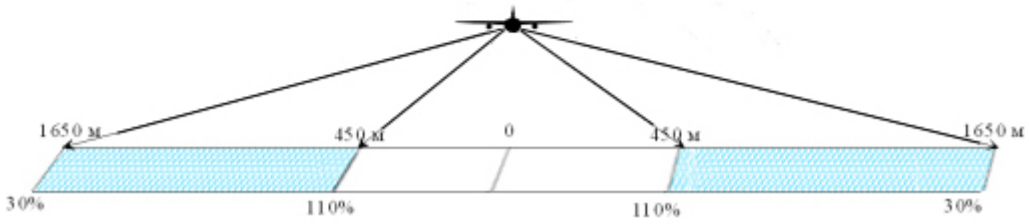


Figure 4. Diagram of survey area in aerial observations off the northeast coast of Sakhalin (An-28 airplane, two observers, % - viewing angle.

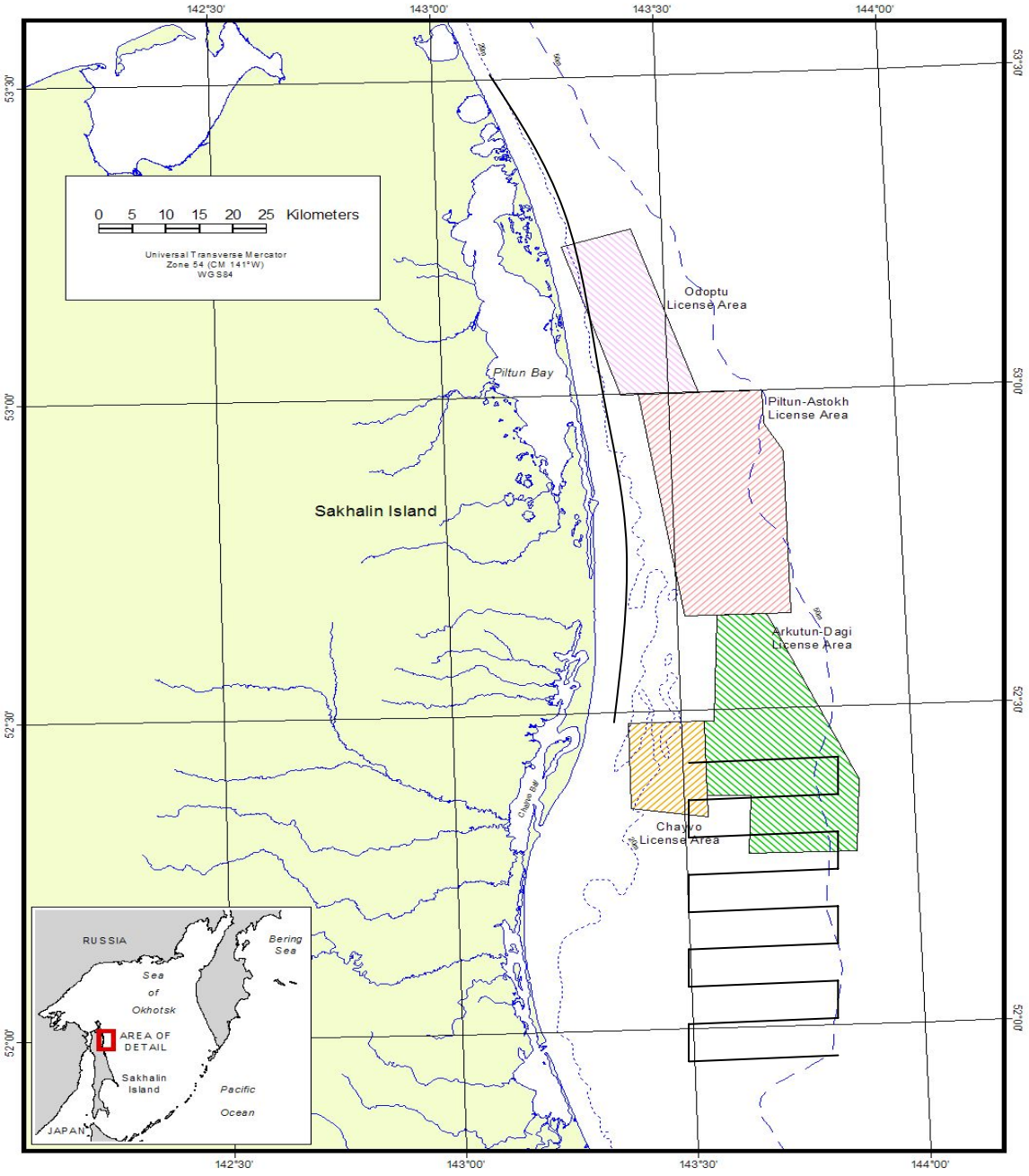


Figure 5. Scheduled gray whale observation transect grid in the Piltun and Offshore feeding areas during the vessel-based survey, August-September 2004.

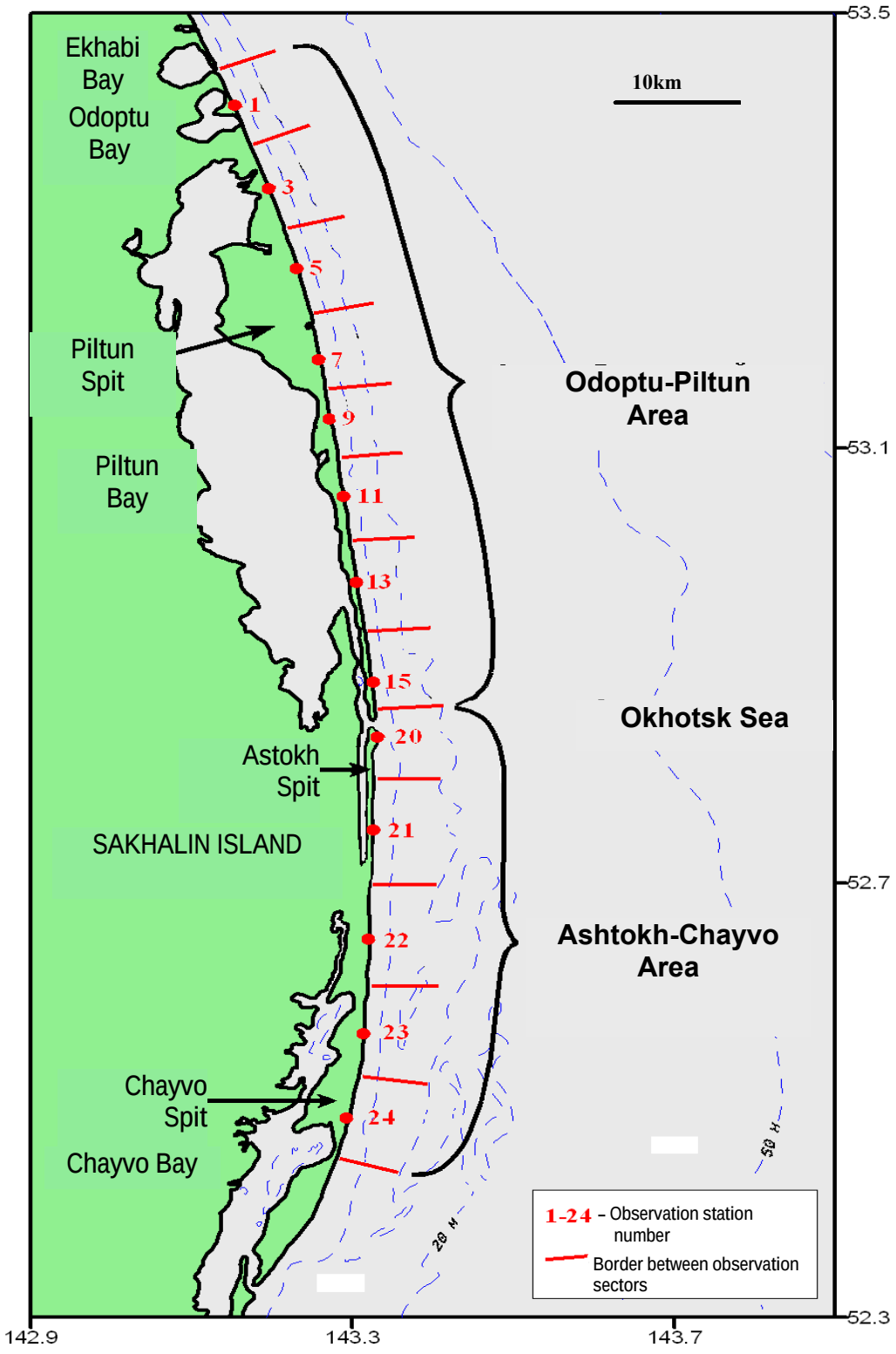


Figure 6. Location of observation stations and their survey zones during shore-based gray whales survey in the Piltun Bay area, July – October 2004.

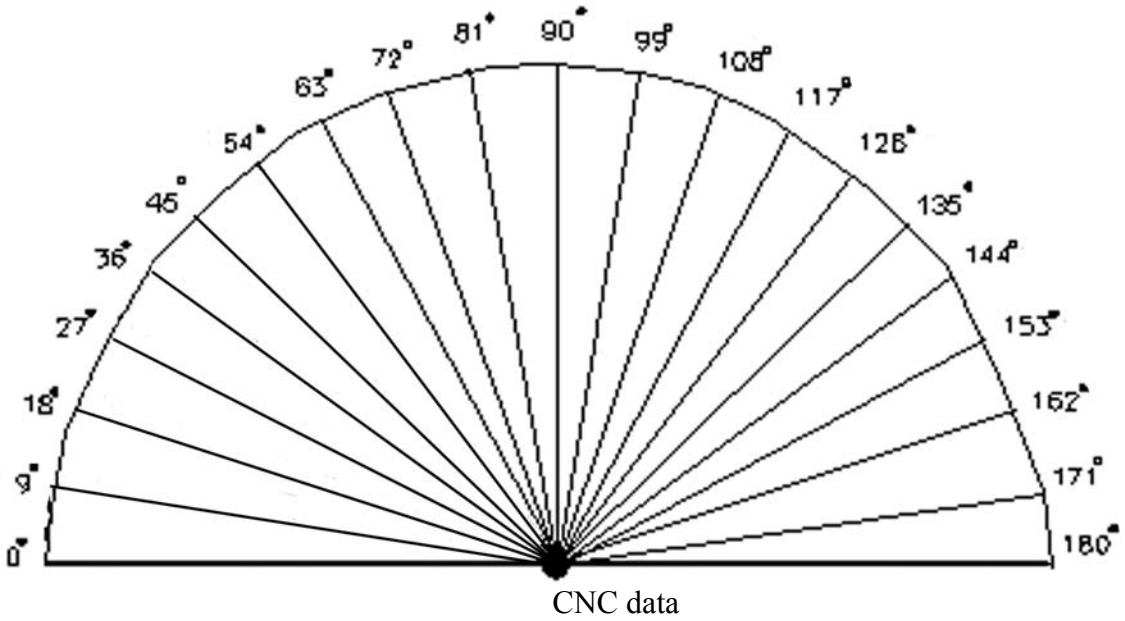


Figure 7. Diagram of 9° water area scanning sectors during shore-based gray whale surveys in Piltun feeding area, July – October, 2004.

Figure 8. Photograph of binocular stabilizing posts.

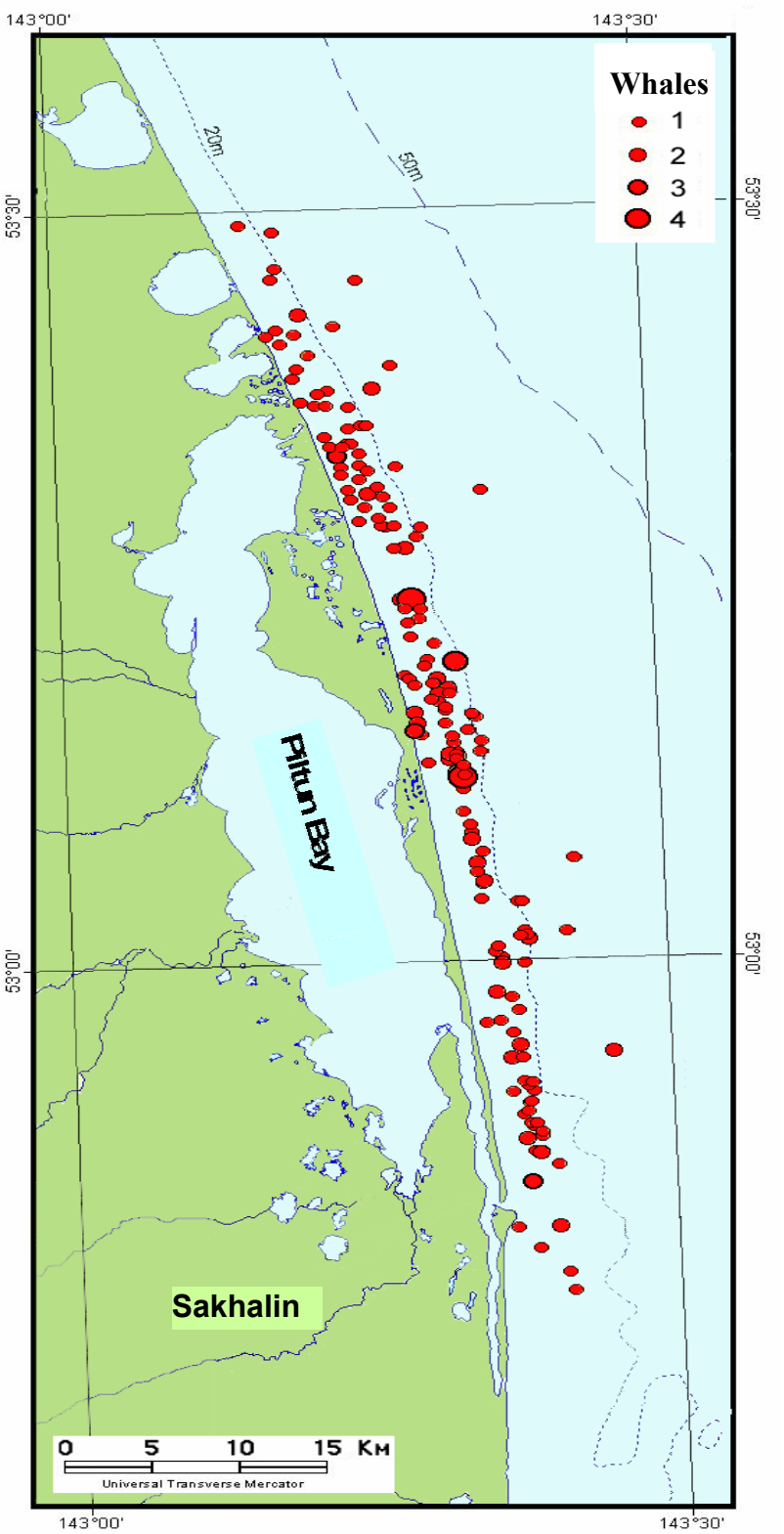


Figure 9. The general distribution of gray whales in the Piltun Feeding area (July – November, 2004). This graph includes only sightings from surveys where all four primary survey transects were flown. Only whales sightings observed between 30 – 110 % are included.

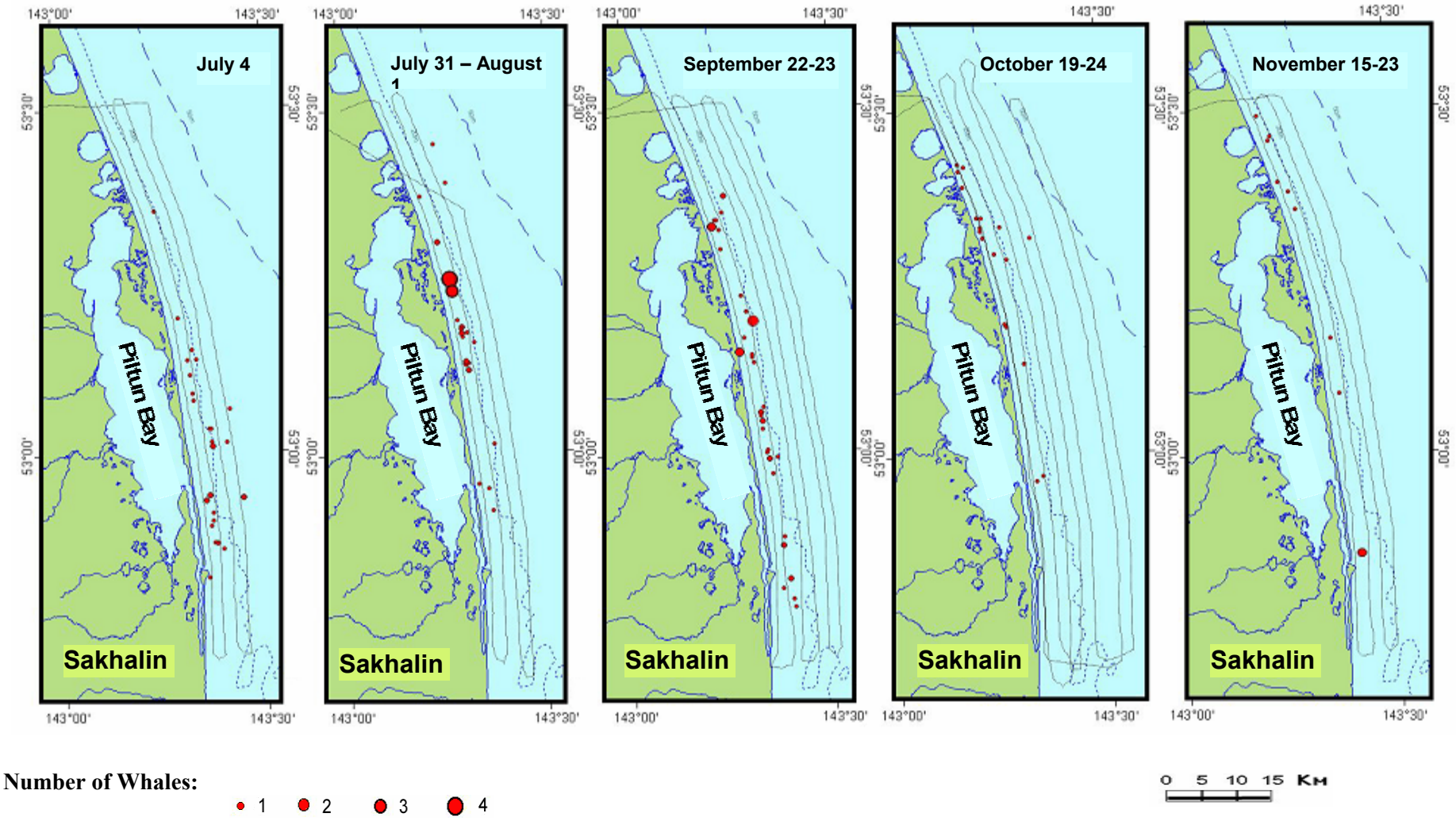


Figure 10. Distribution of gray whales in Piltun Area during July-November 2004 (based on aerial surveys). Lines indicate survey flight transects.

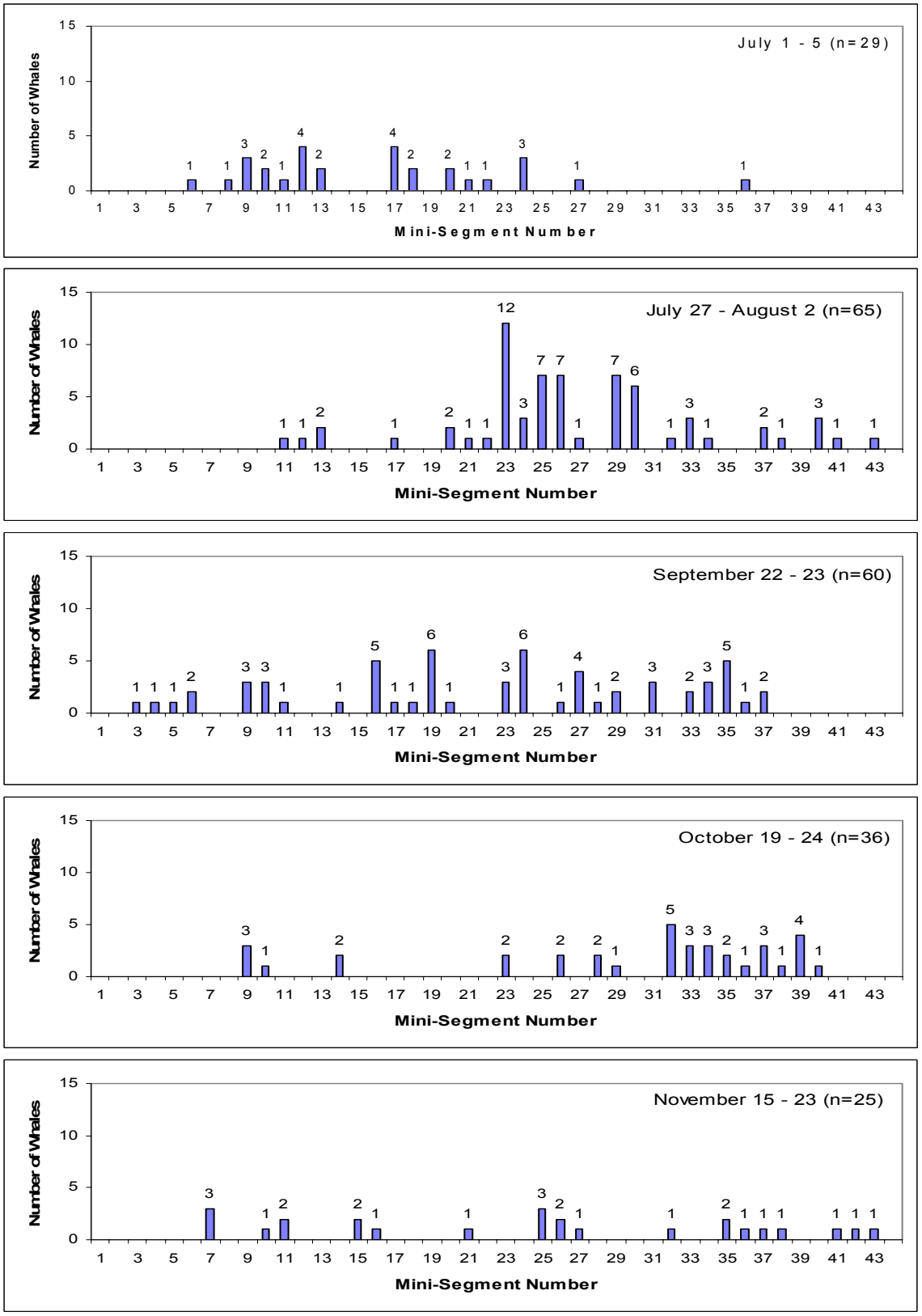
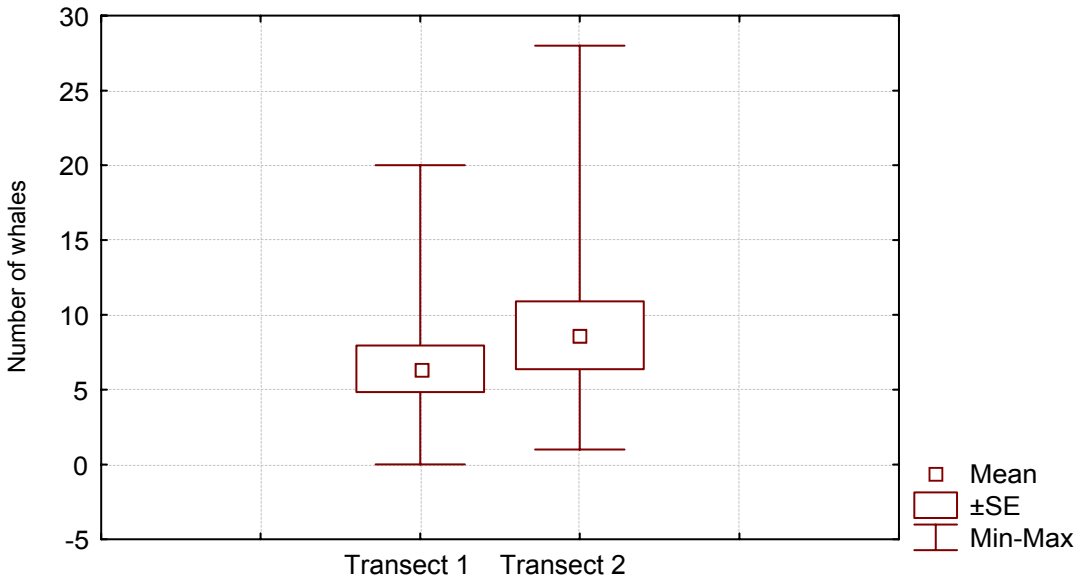


Figure 11. Gray whale distribution by minisectors of the Piltun Area in July-November 2004 (based on aerial observational data).



Group 1-group2	Student Criterion						
	Av. group 1	Av. group 2	Value t	df	p	n group 1	N group 2
Transect 1 – Transect 2	7.17	8.75	-0.51	22.00	0.62	12	12

Figure 12. Average number of gray whales recorded on transects 1 and 2 of Piltun Area in July-November 2004 (viewing angle 30-110%).

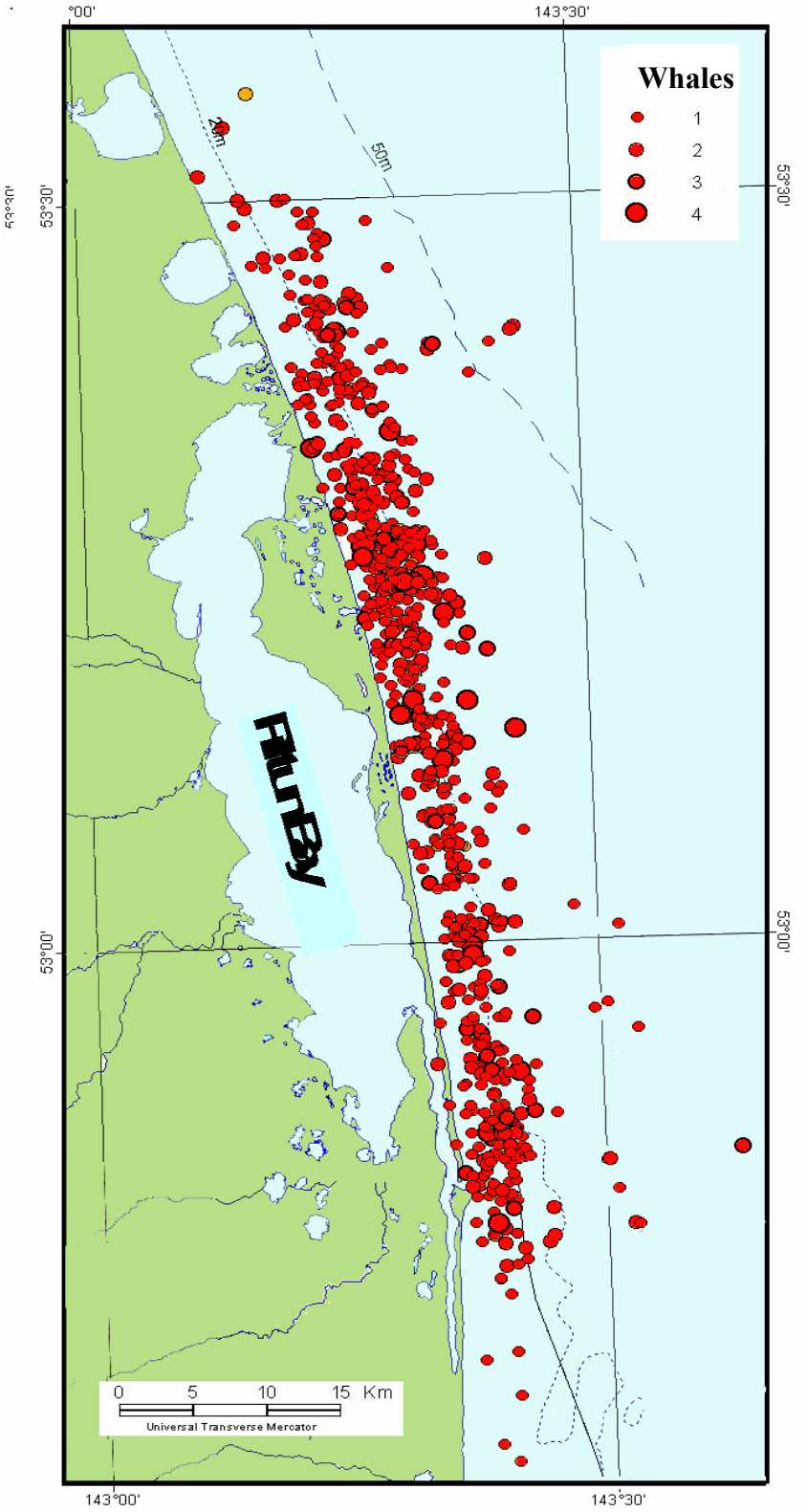


Figure 13. Distribution of gray whales in the Piltun Area during August 7 – October 1, 2004 (based on partial and full vessel survey data).

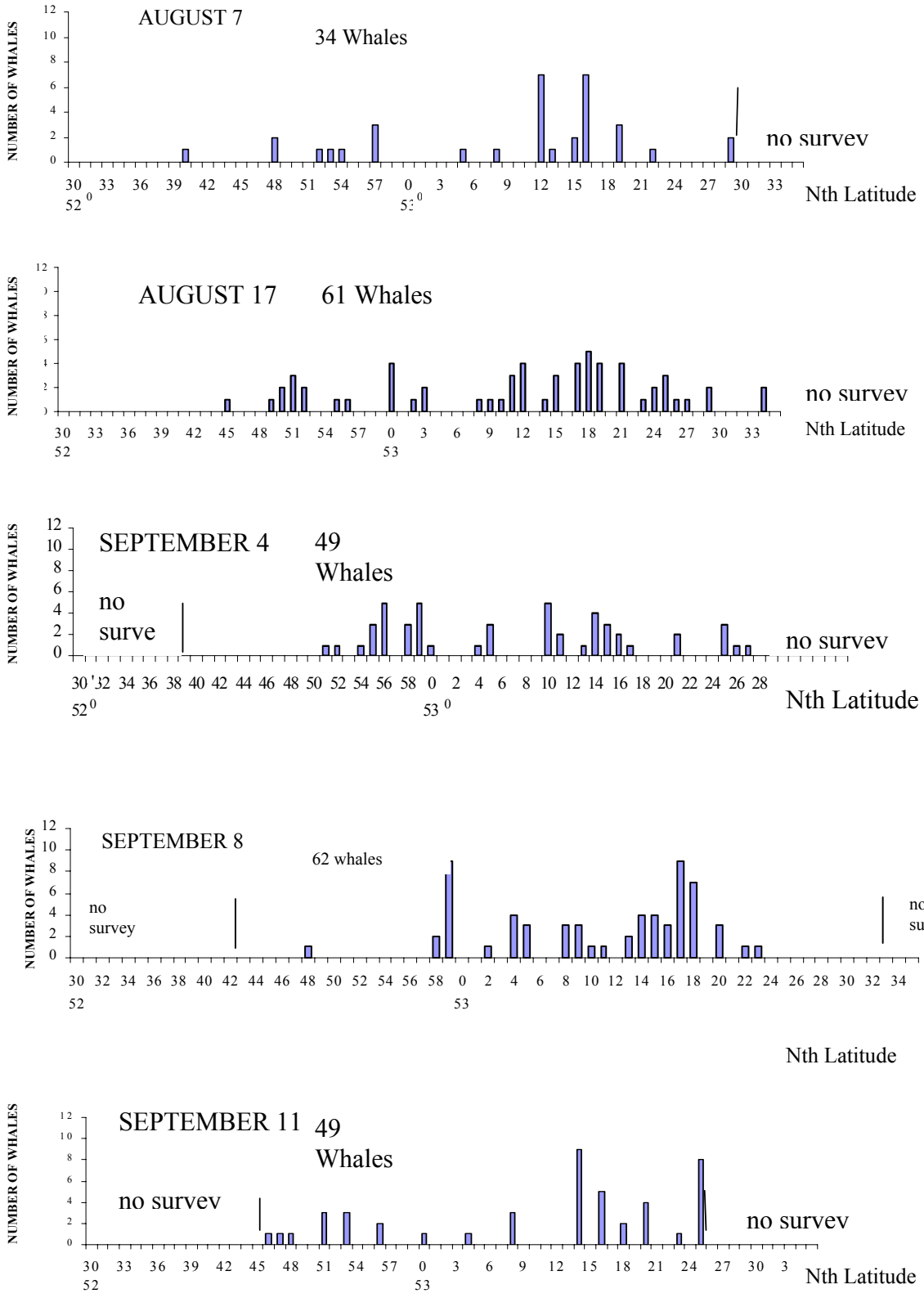
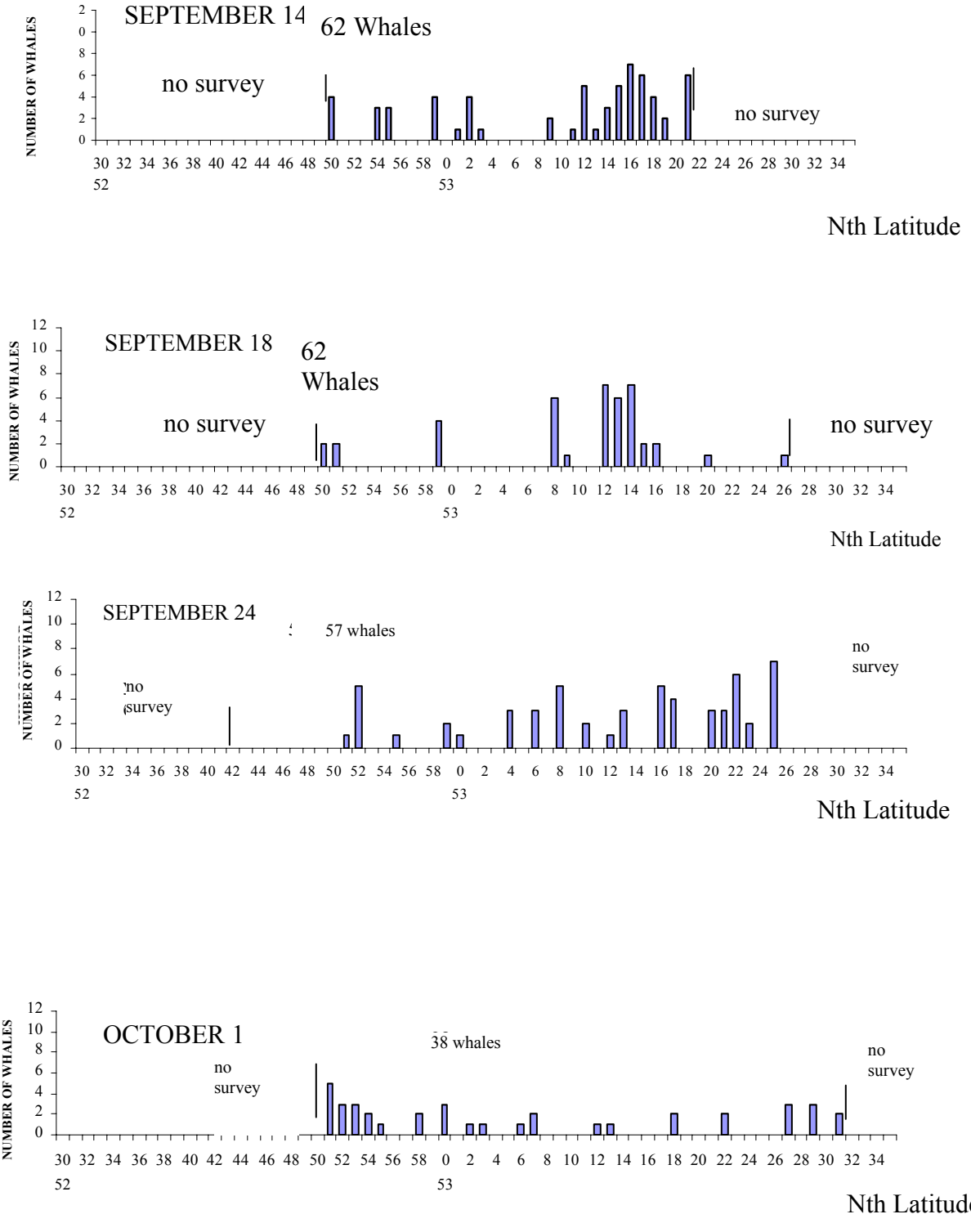


Figure 14. Gray whale distribution by minisectors in the Piltun Area during August 7 – October 1, 2004. (based on vessel-based survey data – 7 August, 14 August and 4 September were dedicated vessel surveys).

Figure 14. (Continued)



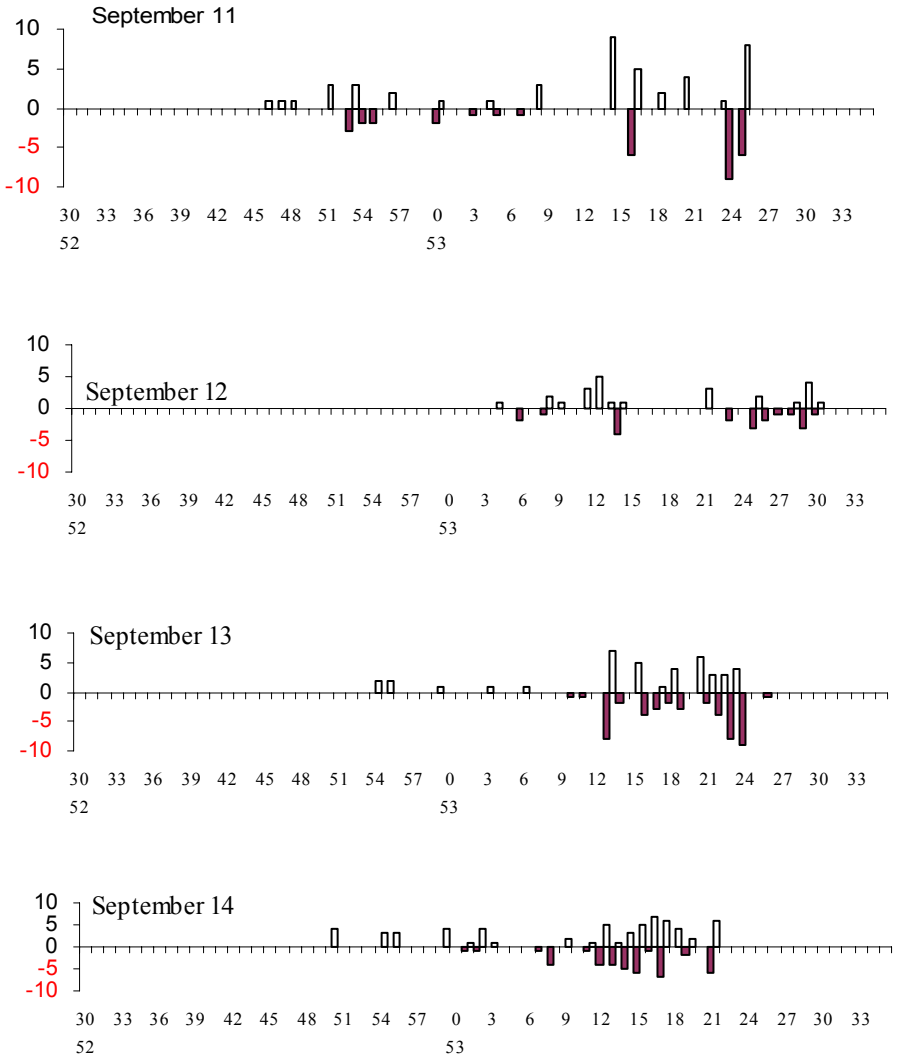


Figure 15. Results of repeated shipboard surveys of gray whales in some sections of the Piltun Area in August – September 2004. (Lower column – survey of animals during first half of the day: Upper column – survey of animals during second half of the day).

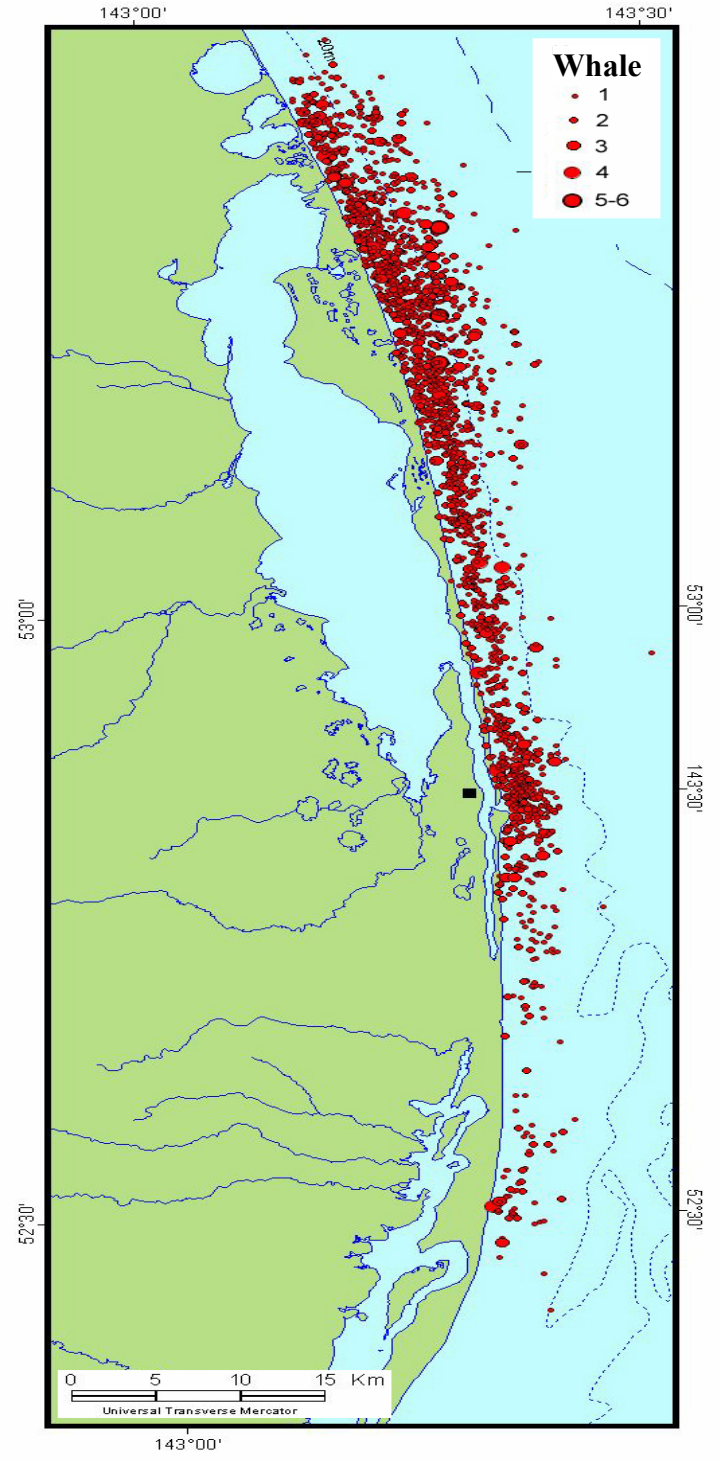


Figure 16. Gray whale distribution in the Piltun area in July – October 2004 (based on shore-based survey data, all sightings recorded for the season). Only data from days when surveys were performed by both teams are displayed.

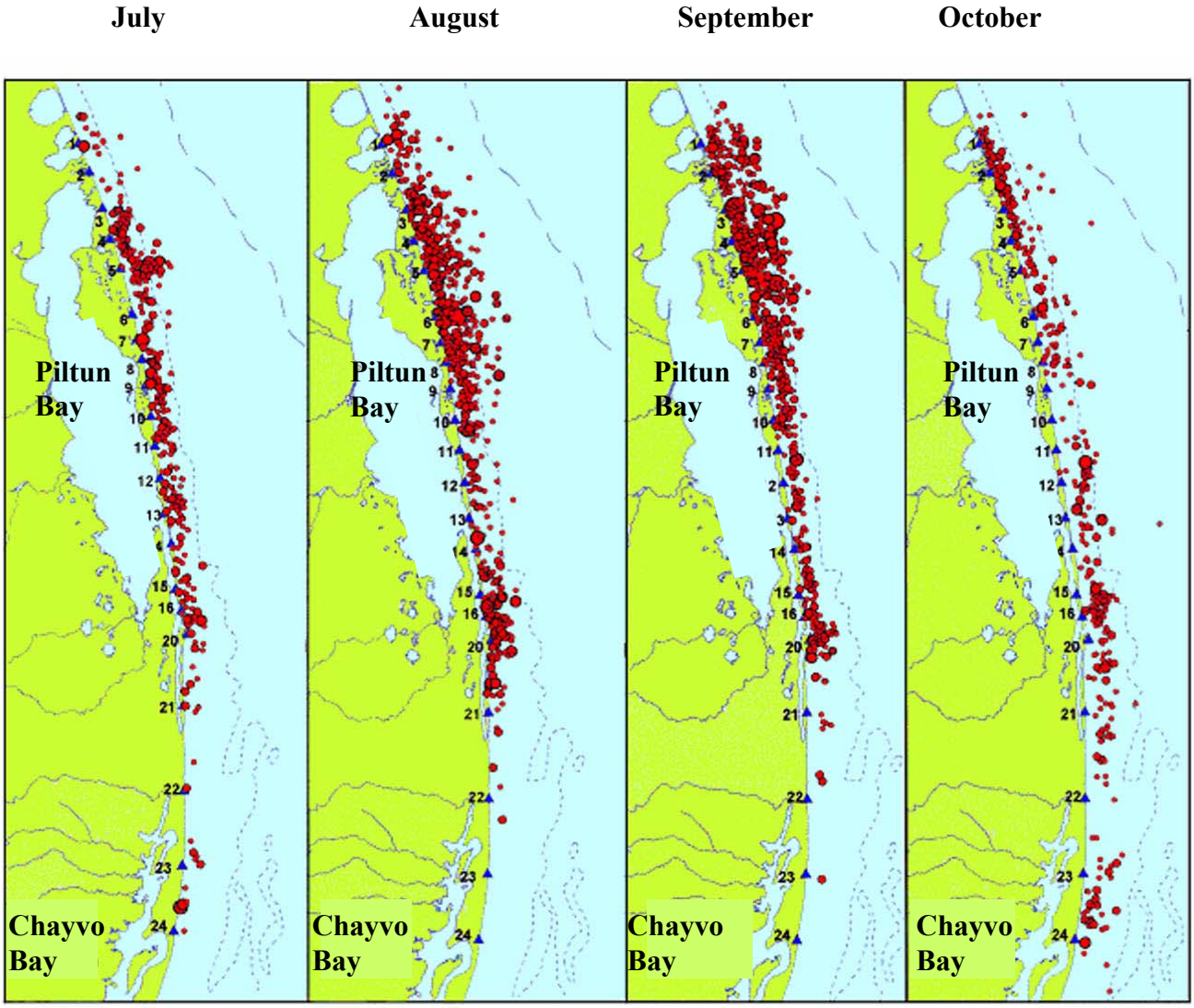


Figure 17. Distribution of gray whales in Piltun feeding area in July-October 2004 (data from full coastal surveys only).

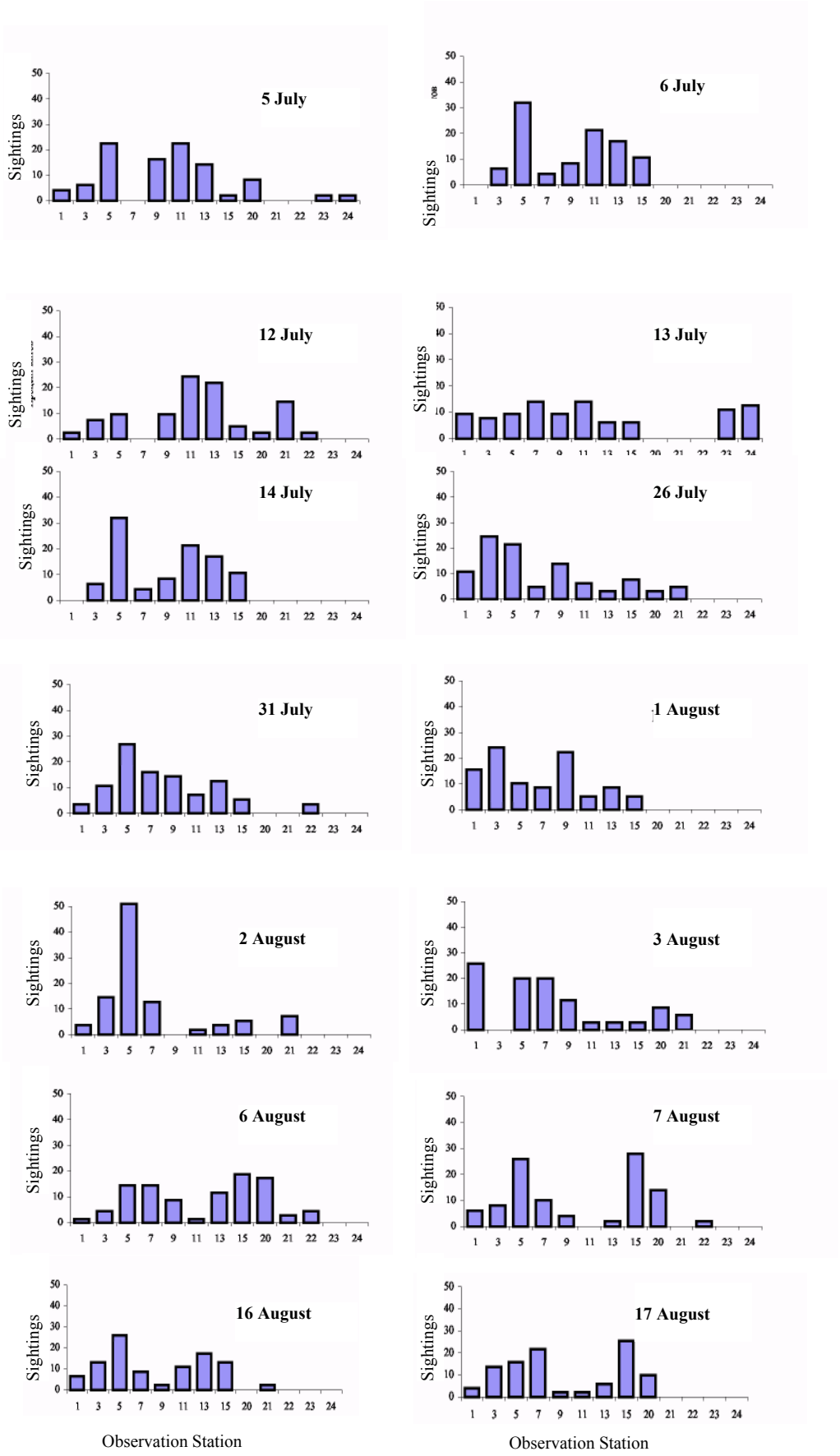
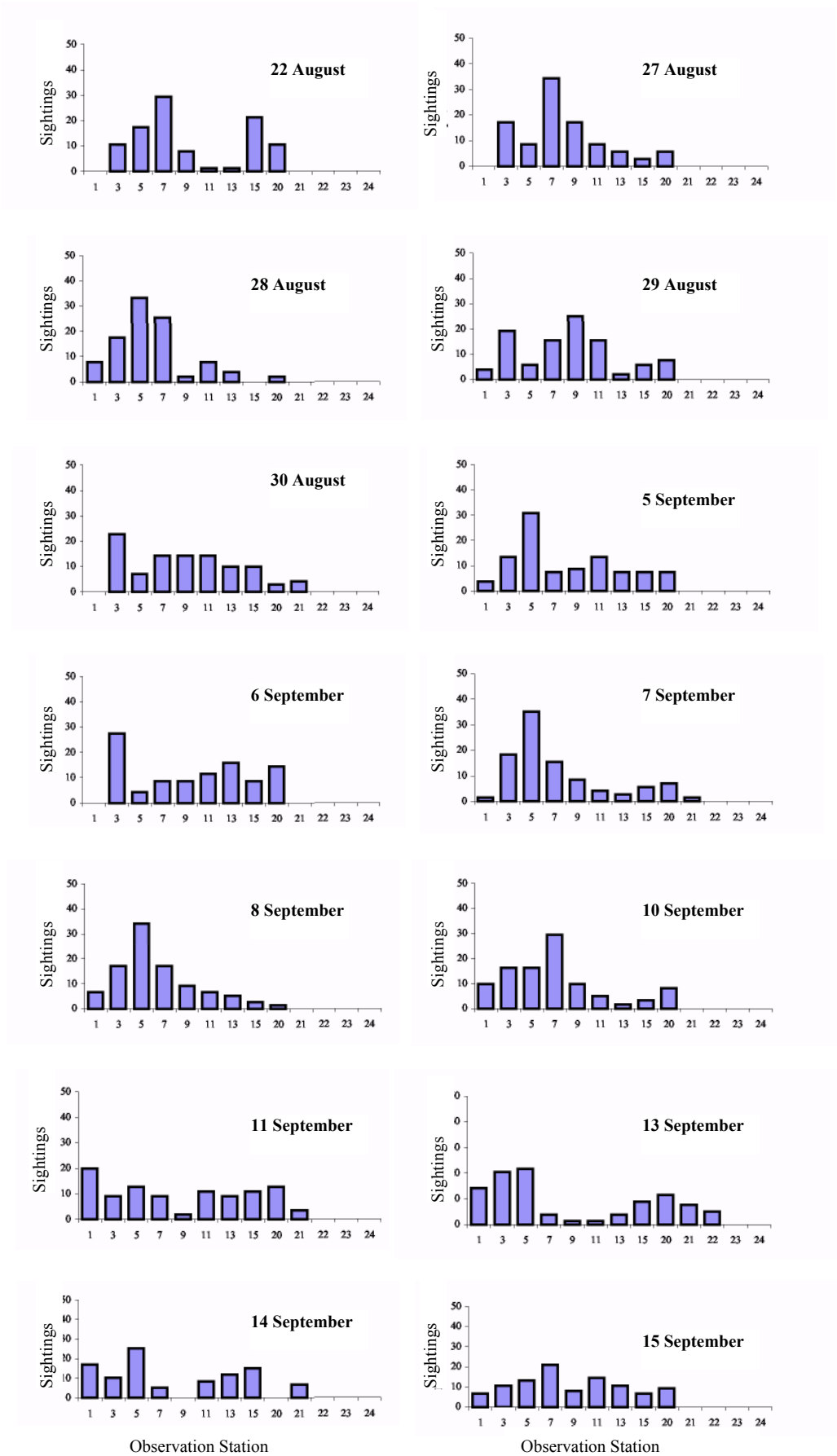
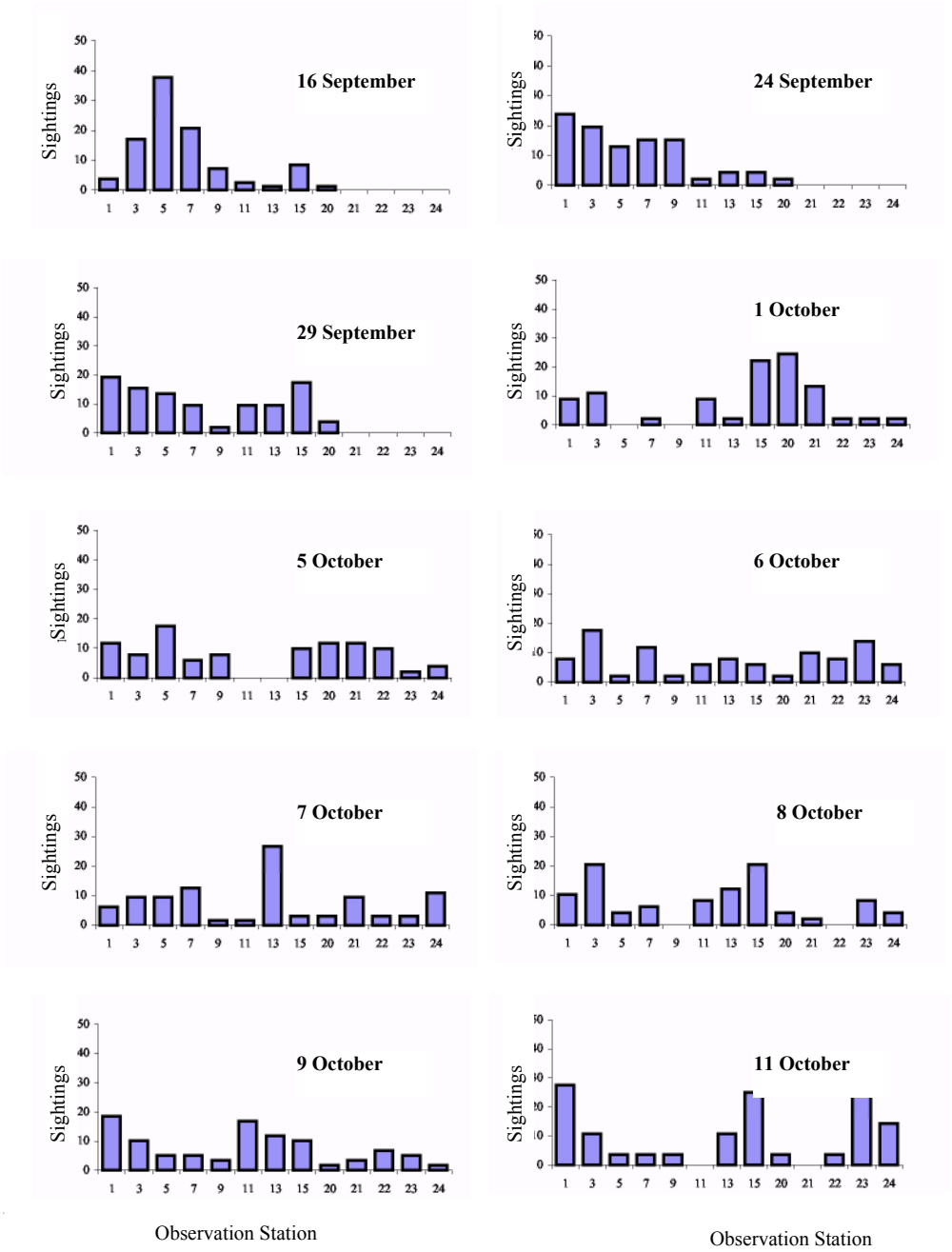


Figure. 18. Gray whale sightings as a function of observation station in the Piltun feeding area July – October 2004 (based on shore-based surveys).


22 August
27 August
28 August
29 August
30 August
5 September
6 September
7 September
8 September
10 September
11 September
13 September
14 September
15 September
Sightings
Observation Station
Observation Station


16 September
24 September
29 September
1 October
5 October
6 October
7 October
8 October
9 October
11 October
Sightings
Observation Station

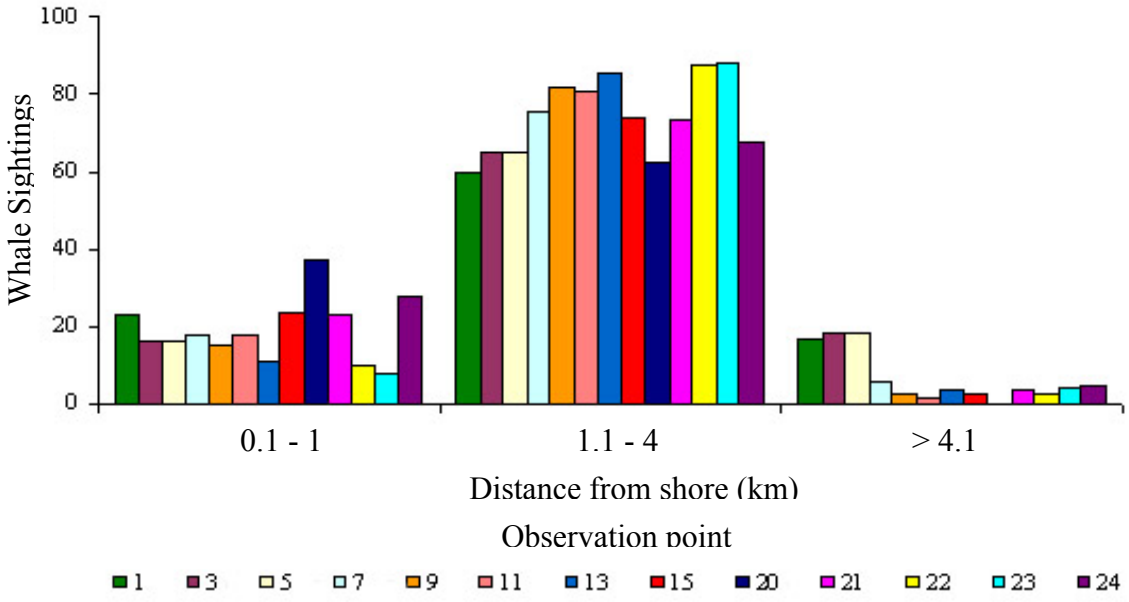


Figure 19. Distribution of gray whales as a function of distance form shore in the Piltun feeding area July – October 2004 (based on shore-based surveys).

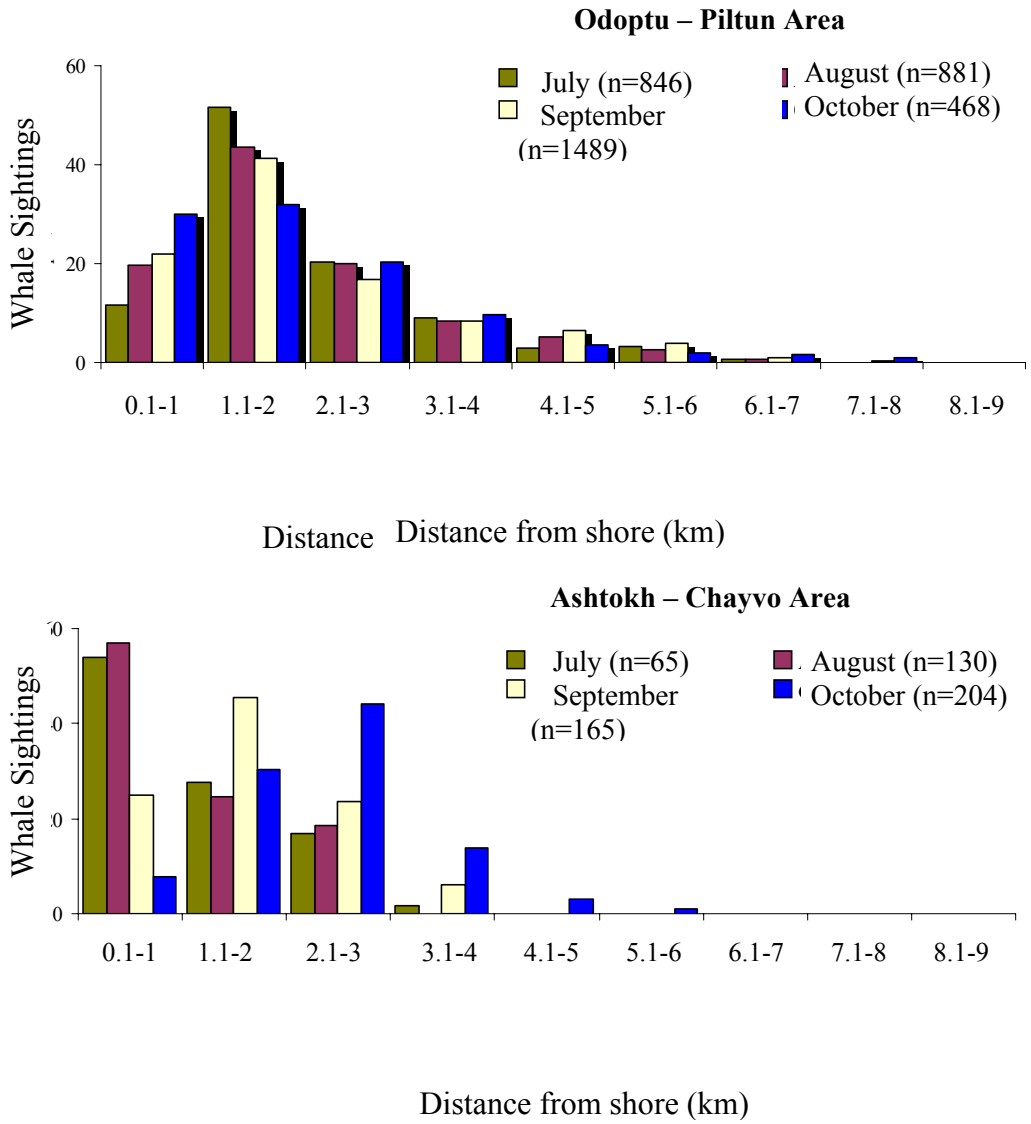


Figure 20. Distribution of gray whales as a function of distance from shore in the north and south survey areas of the Piltun feeding area, Jouly – October, 2004 (shore based surveys).

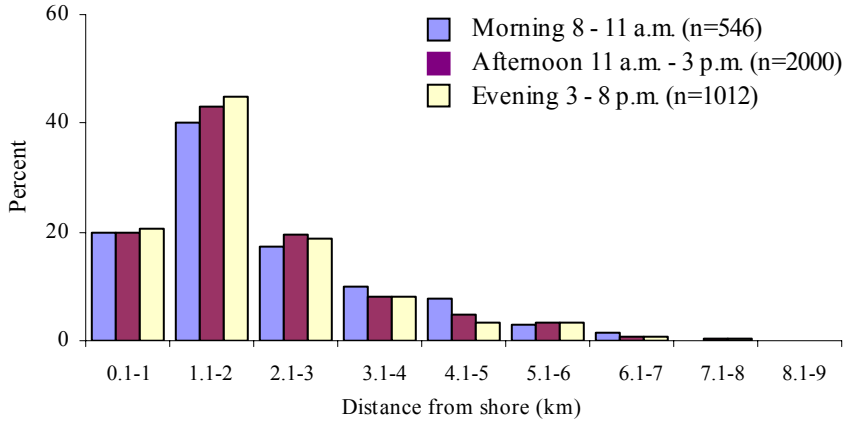


Figure 21. Gray whale distribution as a function of distance from shore and time of day in the northern and southern parts of the Piltun Area in July-October, 2004.

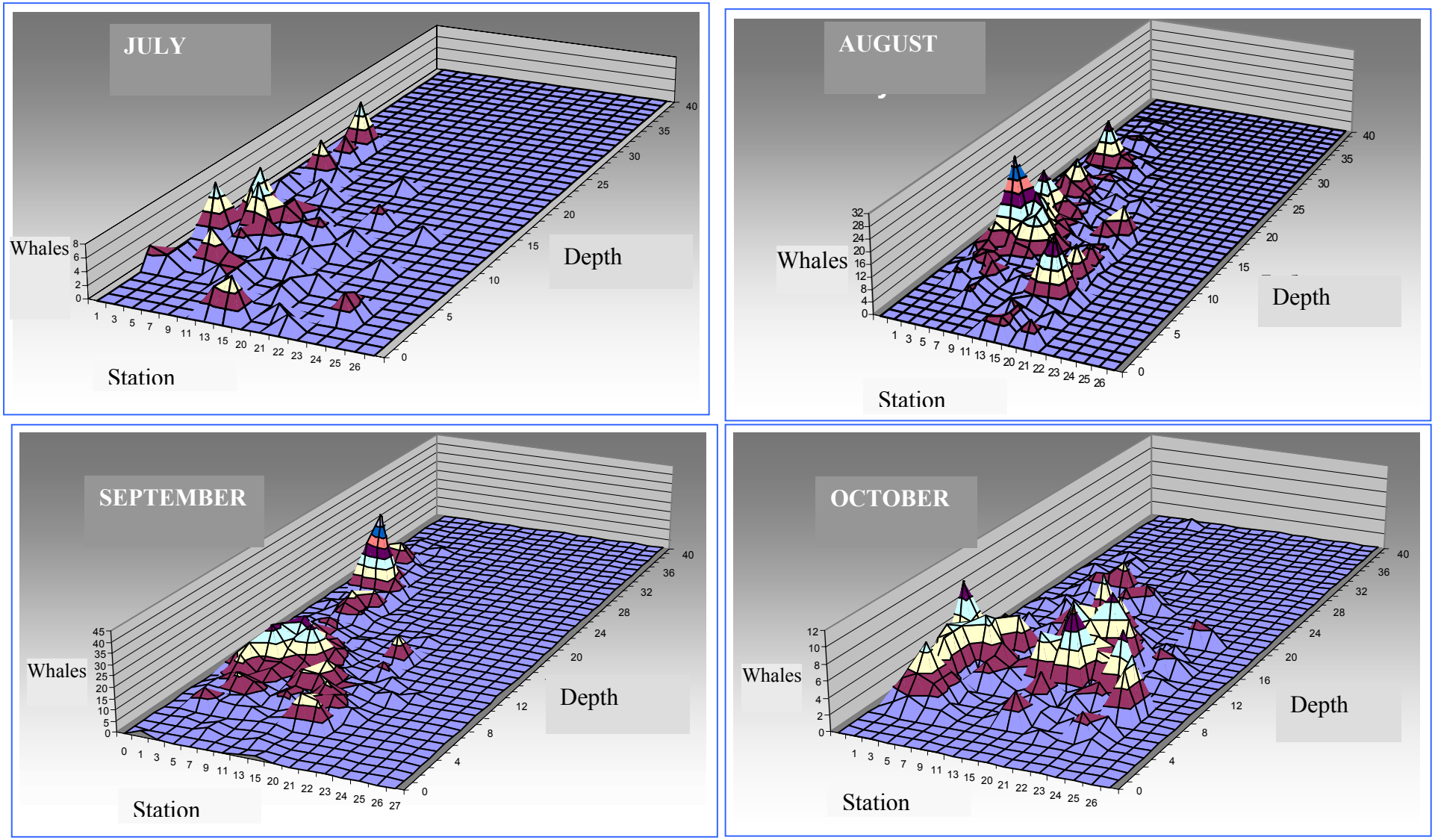


Figure 22. Gray whale distribution in the Piltun area by sea depth in July – October, 2004 (based on shore-based survey data).

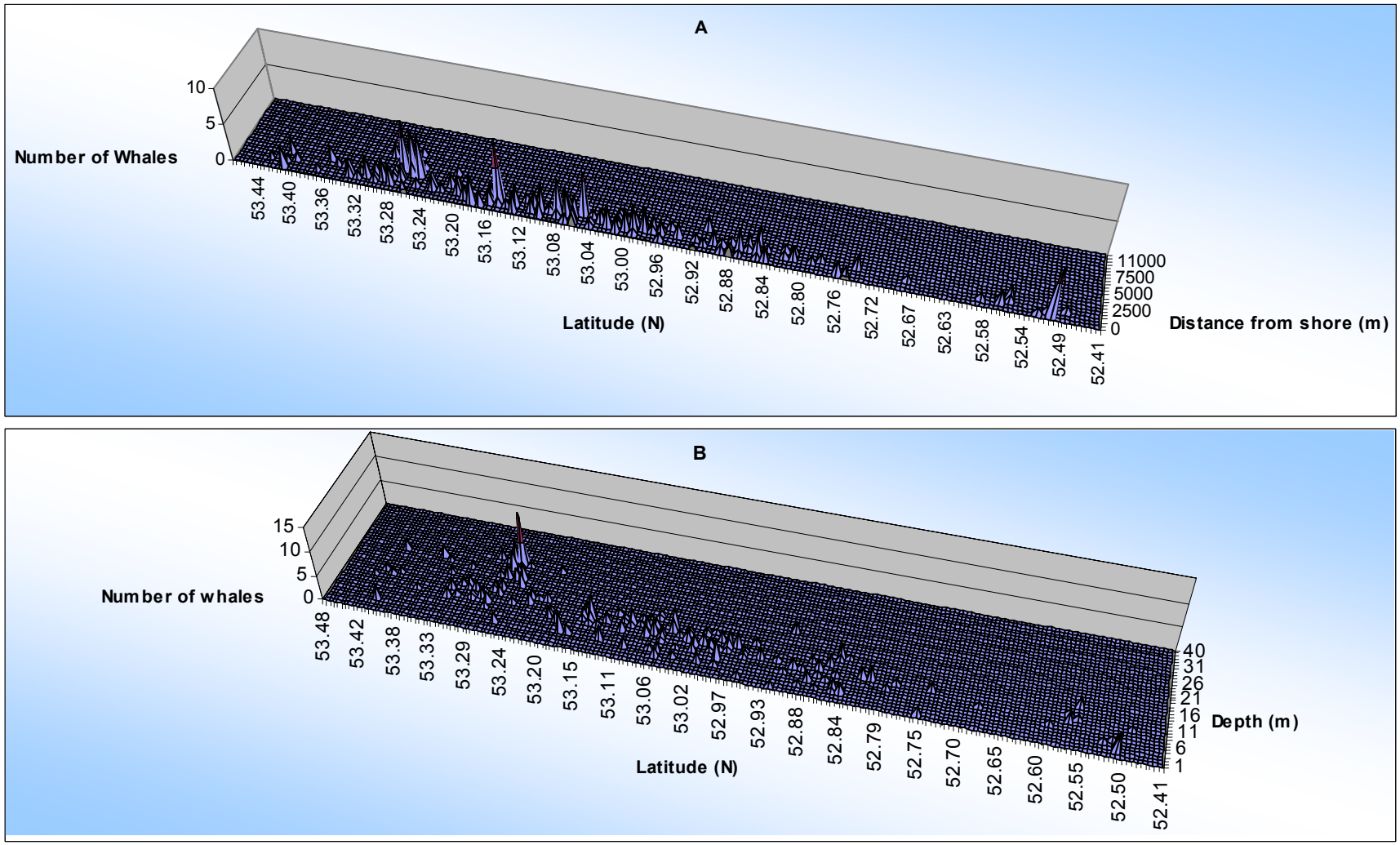


Figure 23. Distribution of gray whales in the Piltun feeding area as a function of distance from shore (À) and of water depth (B) from July 5 to July 24, 2004.

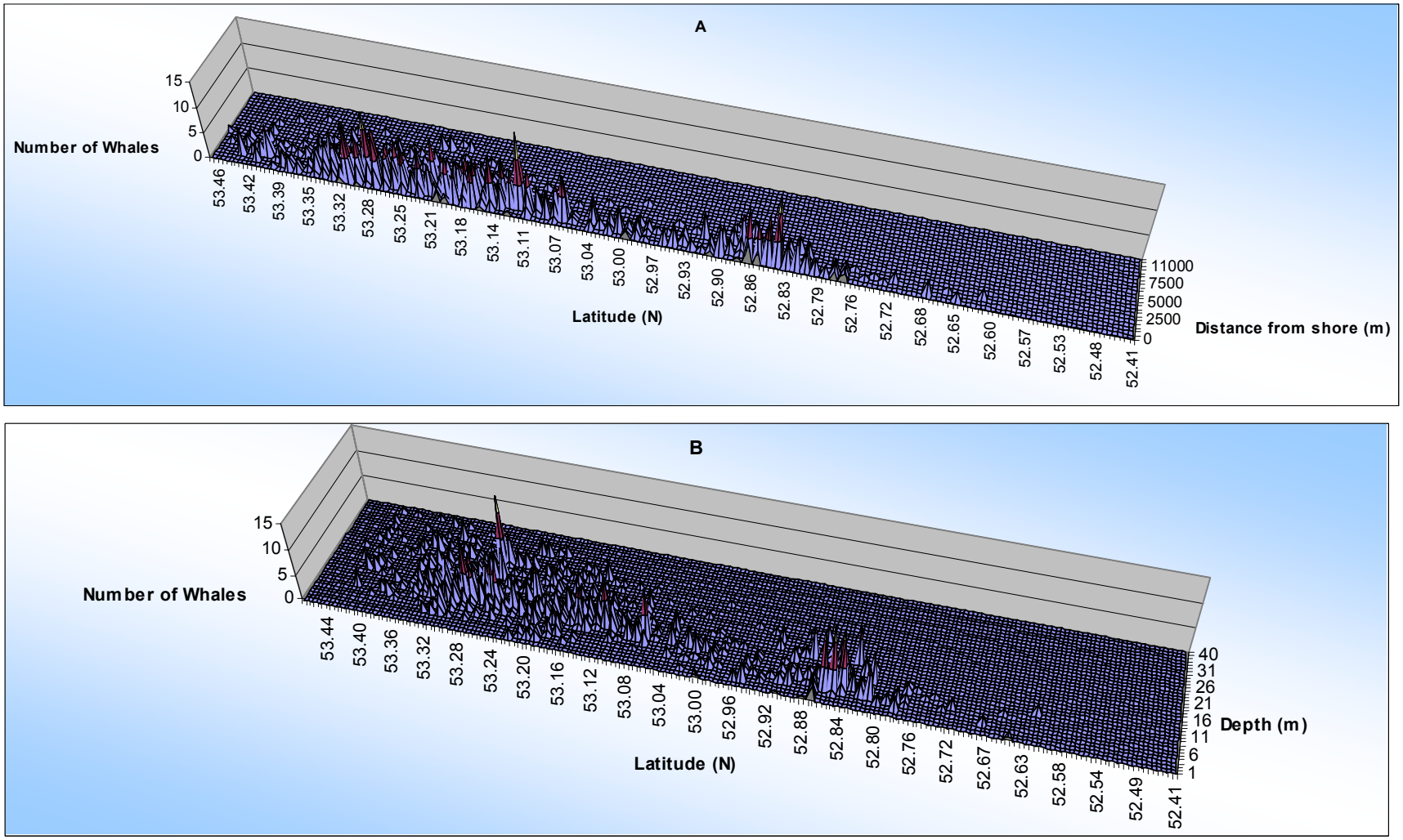


Figure 24. Distribution of gray whales in the Piltun feeding area as a function of distance from shore (À) and of water depth (B) from July 26 to September 5, 2004.

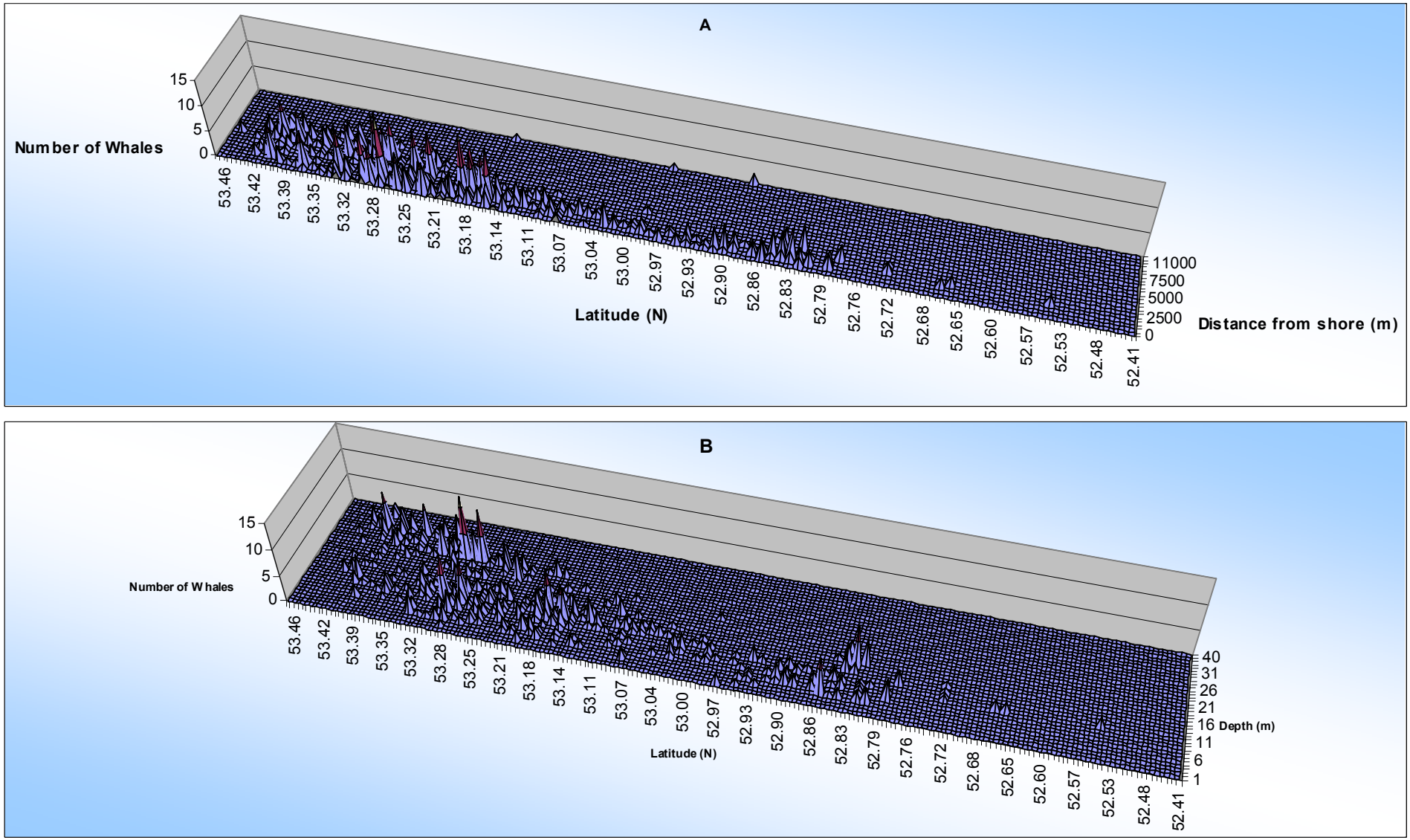


Figure 25. Distribution of gray whales in the Piltun feeding area as a function of distance from shore (À) and of water depth (B) from September 7 to September 29, 2004.

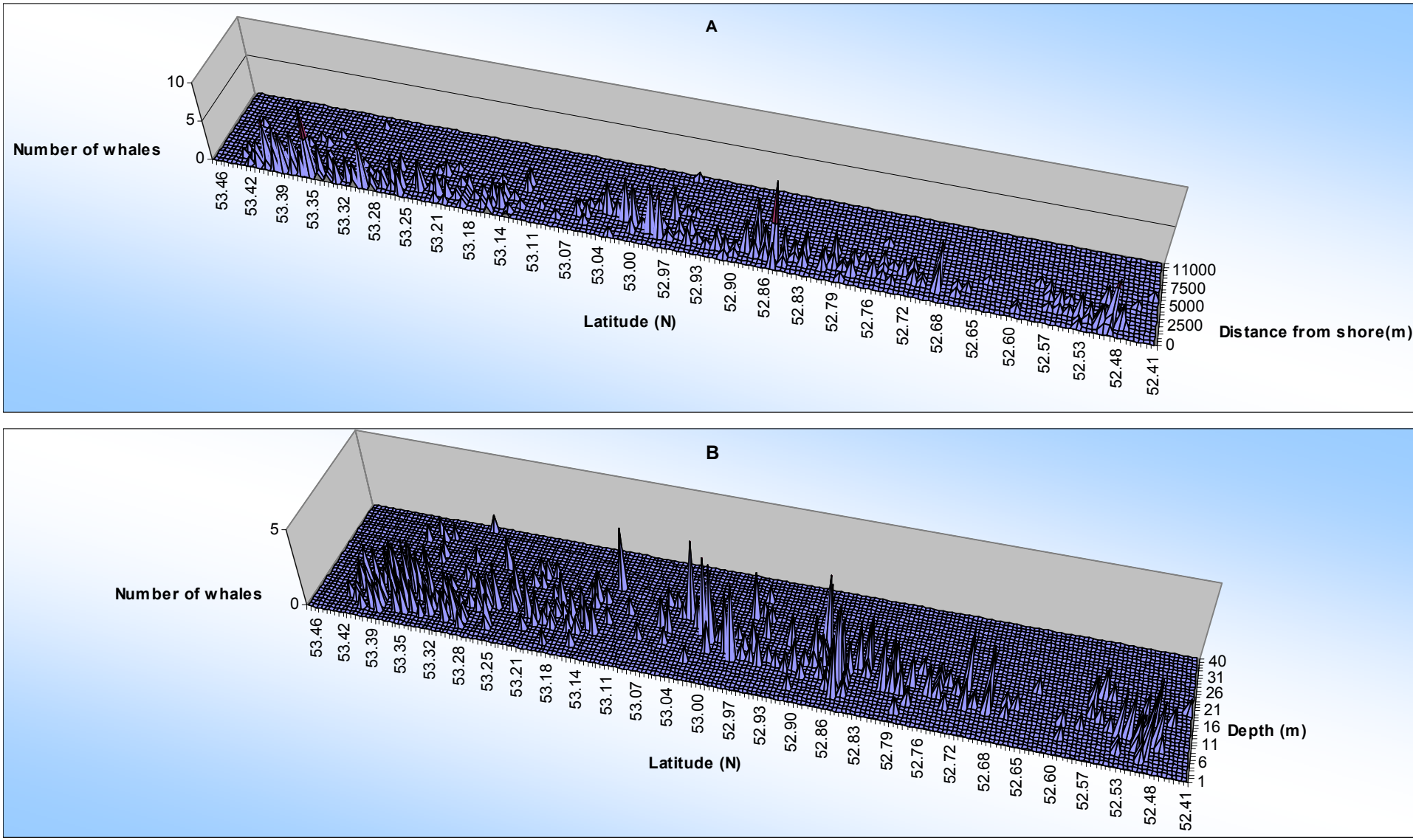


Figure 26. Distribution of gray whales in the Piltun feeding area as a function of distance from shore (À) and of water depth (B) from September 30, 2004 until the end of the survey period (Oct 11th).

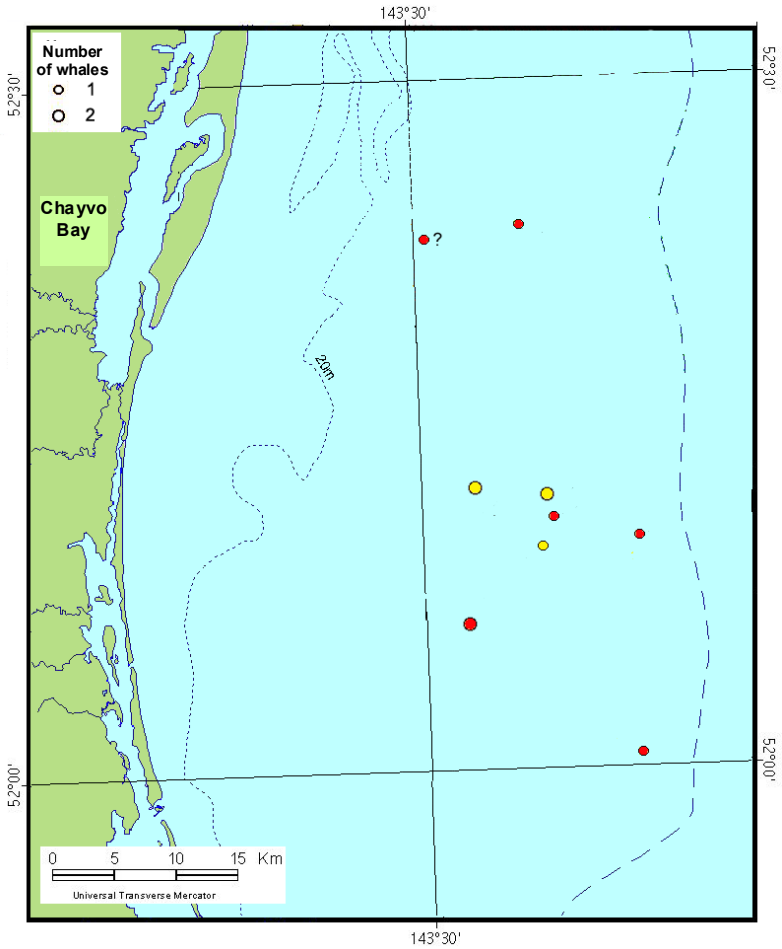


Figure 27. Distribution of gray whales in the offshore area in July-October, 2004 (based on aerial surveys). Red markers indicates whales observed on-transect (30% -110%). Yellow markers indicate whales observed off-transect.

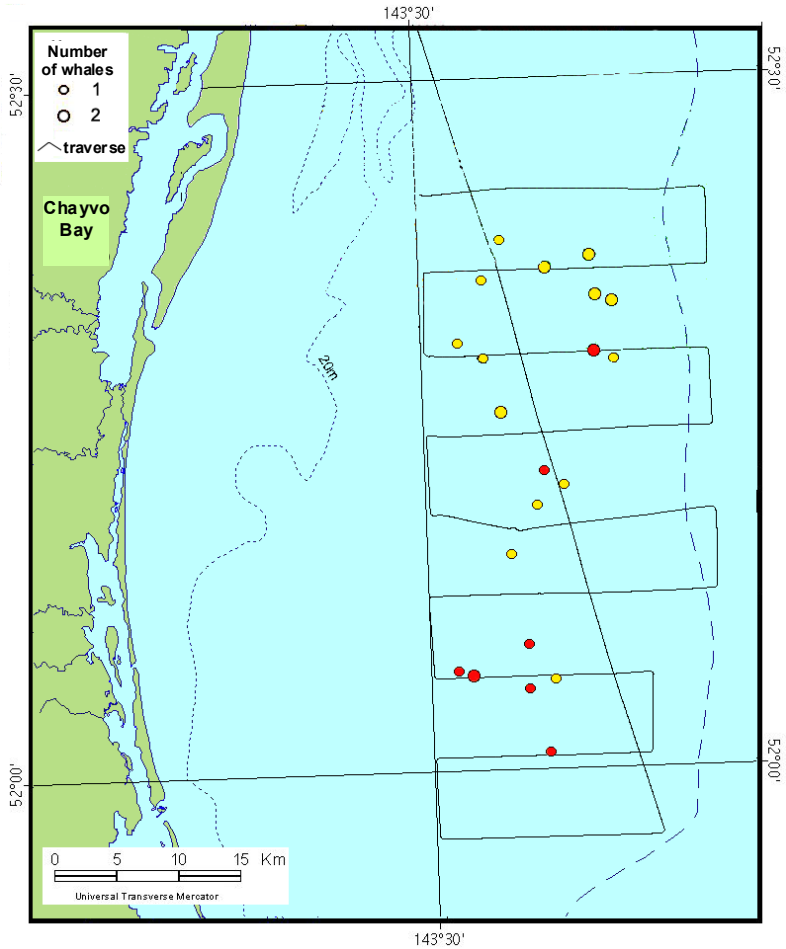
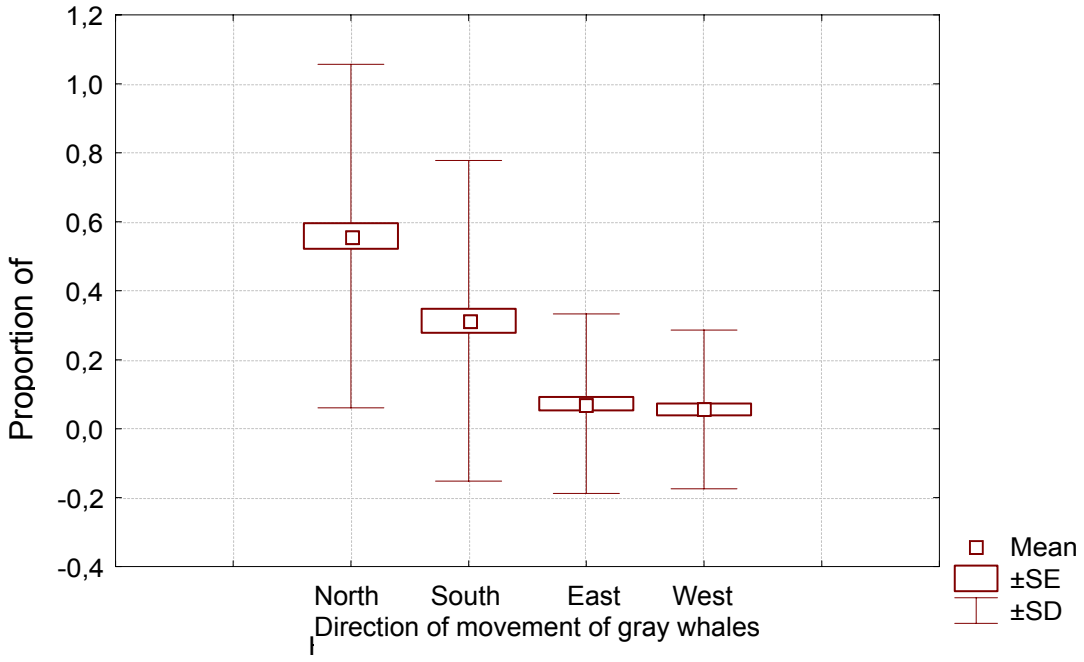


Figure 28. Distribution of gray whales in the offshore area in July-October, 2004 (based on vessel surveys). Red markers indicate whales observed on September 21st, 2004. Yellow markers indicate whales observed on other dates.



Group 1 vs. group 2	Student Criterion						
	Av. group 1	Av. group 2	Value t	df	p	n group 1	n group 2
North vs. South	0.56	0.31	4.83	356.00	0.00	179	179

Figure 29. Direction of movement of gray whales when observed in Piltun Area in July-November 2004 (based on aerial observation data).

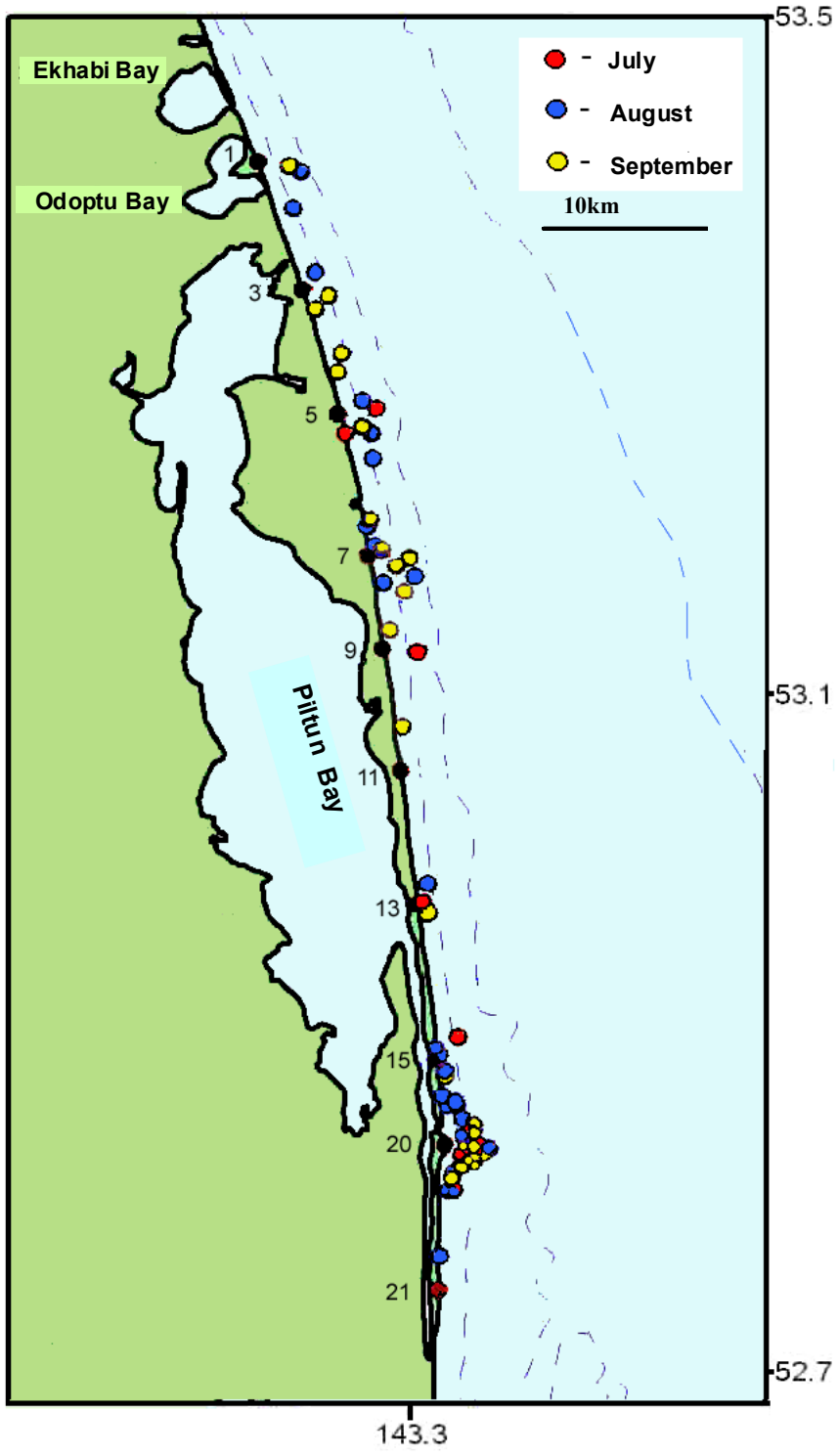


Figure. 30. Locations of gray whale cows with calves in the Piltun feeding area, northeast Sakhalin, July – September 2004 (based on shore-based surveys).

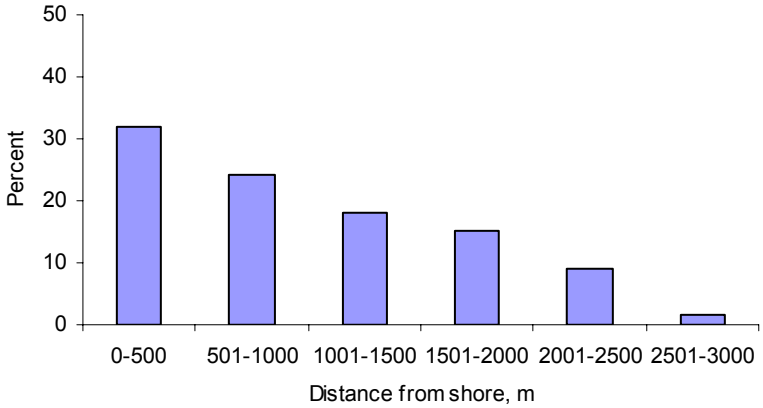


Figure 31 Sighting frequency of gray whale cow-suckling calf pairs at different distances from shore in the Piltun Area in July -September 2004 (based on shore based survey data, n=62).

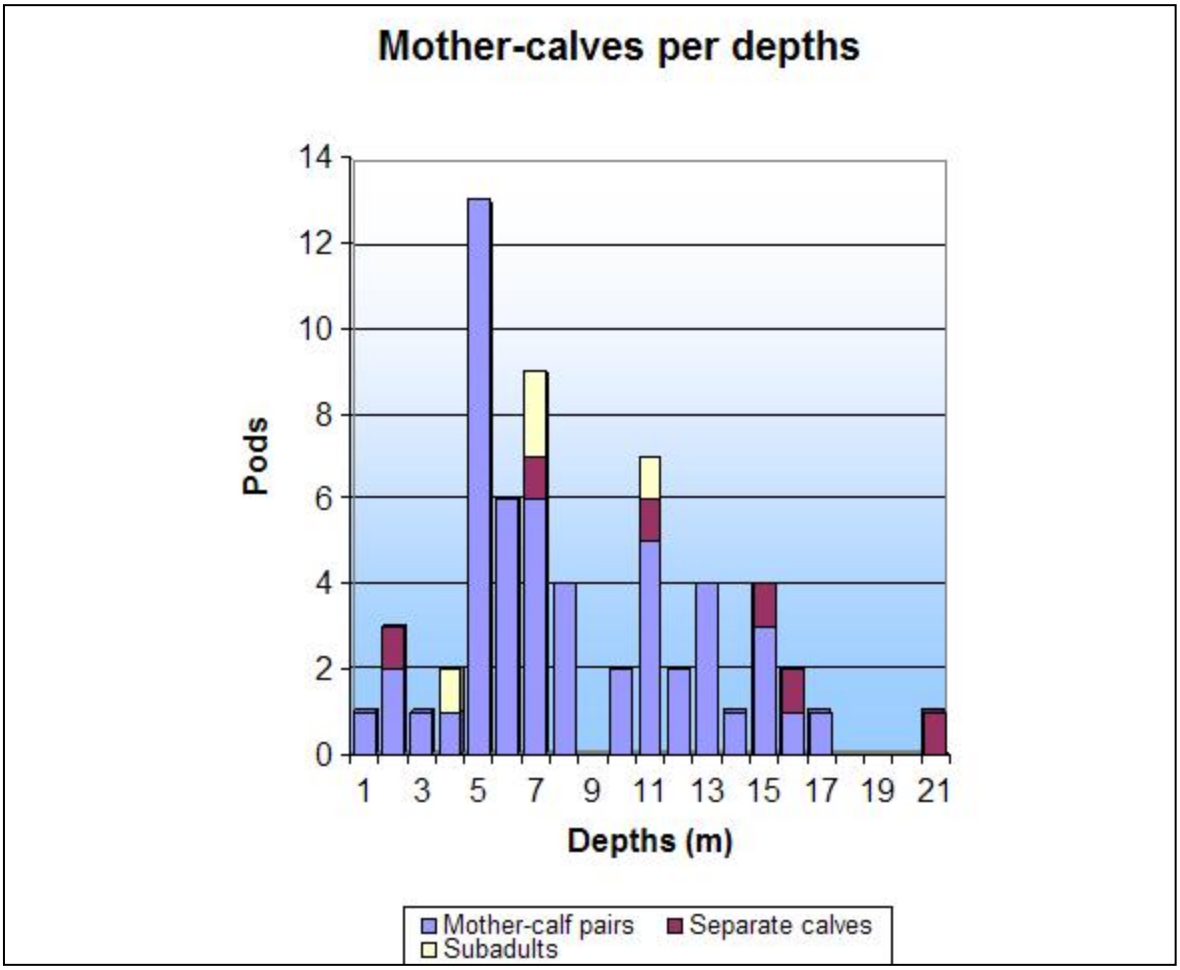
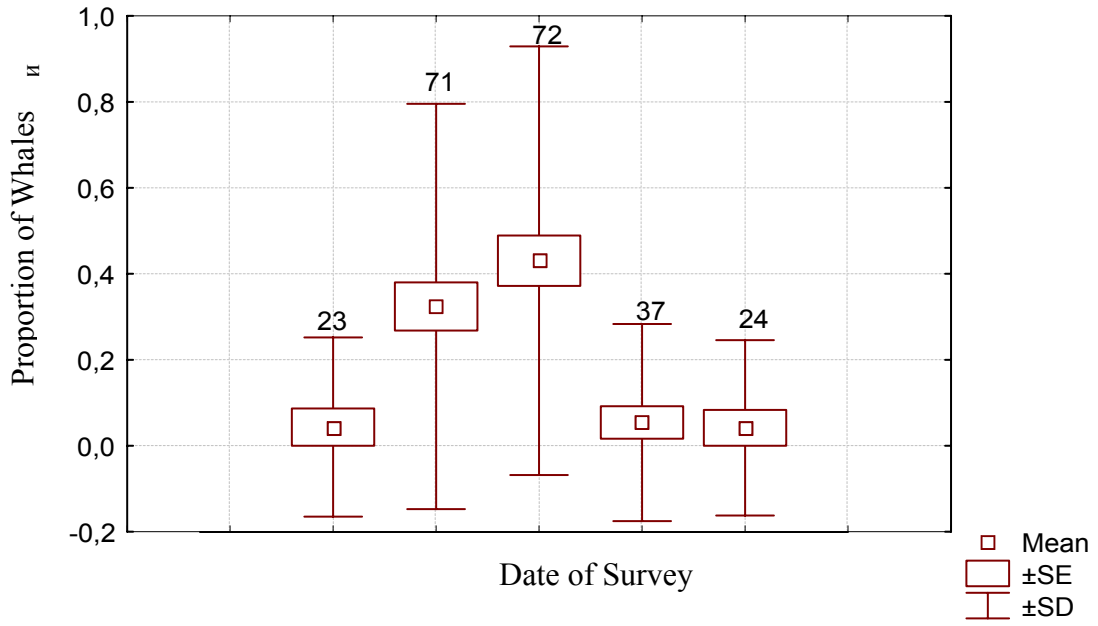


Figure 32. Distribution of gray whale mother-calf pairs as a function of sea depth in the Piltun area in 2004 (based on shore-based survey data).



Group 1 Vs Group 2	T- Test						
	Mean group 1	Mean group 2	T-value	df	p	Valid N Group 1	Valid N Group 2
4.07 vs. 31.07-1.08	0,04	0,32	-2,73	93,00	0,01	23	72
31.07-1.08 vs. 22-23. 09	0,32	0,44	-1,52	140,00	0,13	72	70

Figure 33. Gray whale feeding activity indices in the Piltun feeding area, July – November, 2004 (based on aerial observation data).

Group 1 vs. group 2	Student Criterion						
	Av. group 1	Av. group 2	Value t	Df	p	n group 1	n group 2
sect. 1-3 vs. sect. 4-5	0.28	0.21	1.18	228	0.24	152	78

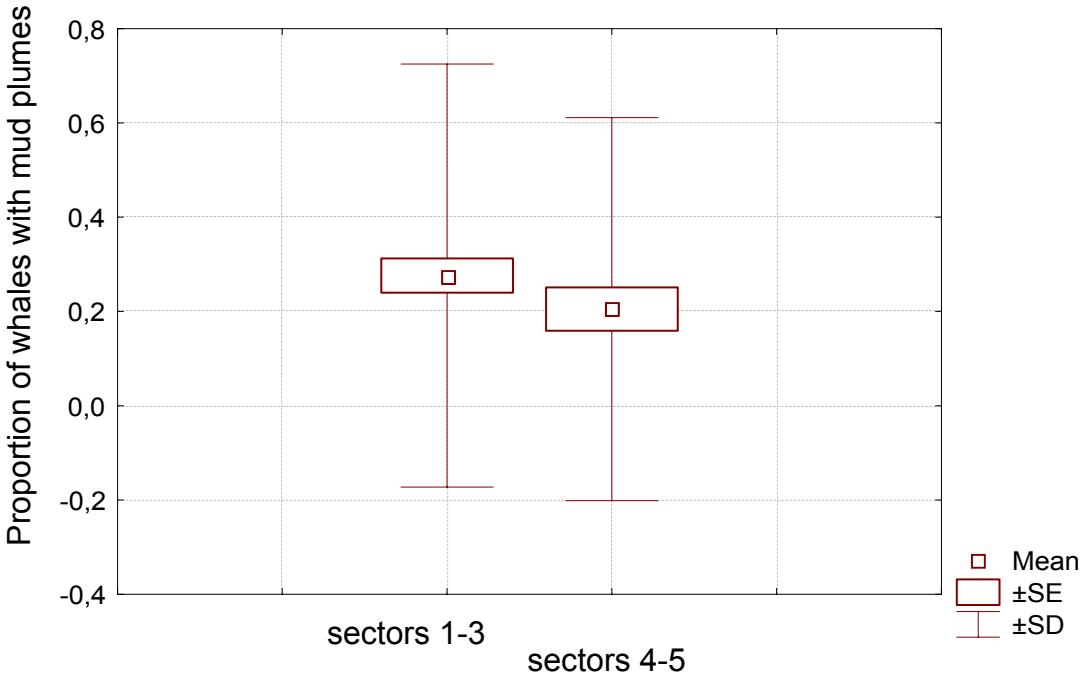


Figure 34. Gray whale feeding activity indices in different parts of the Piltun Area in July-November 2004 (based on aerial observation data).

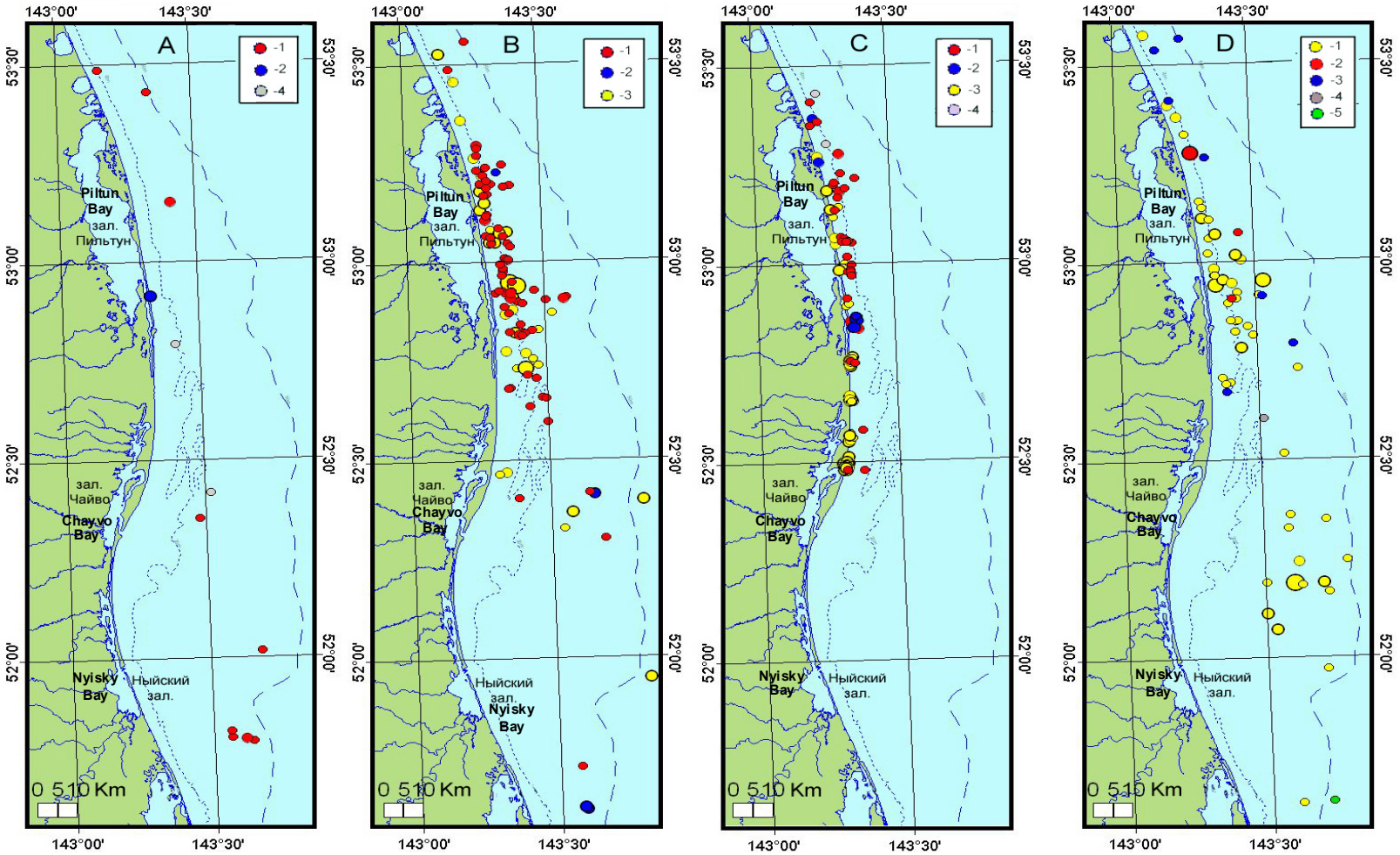


Figure 35. Distribution of other marine mammal species (in addition to grey whales) in nearshore areas of the Northeast Sakhalin, June to October 2004 (based on aerial, offshore and onshore observations) A, B, C - Distribution of cetaceans based on aerovisual (A), offshore (B) and onshore (C) observations; D) Distribution of pinnipeds based on offshore observations data. Cetaceans: 1- Minke whale, 2 - Killer whale, 3 – Harbour porpoise, 4 - unidentified species. Pinnipeds: 1 - Ringed seal, 2 – Spotted seal (Phoca largha), 3 - Bearded seal, 4 - Steller's sea lion, 5 – Northern fur seal.

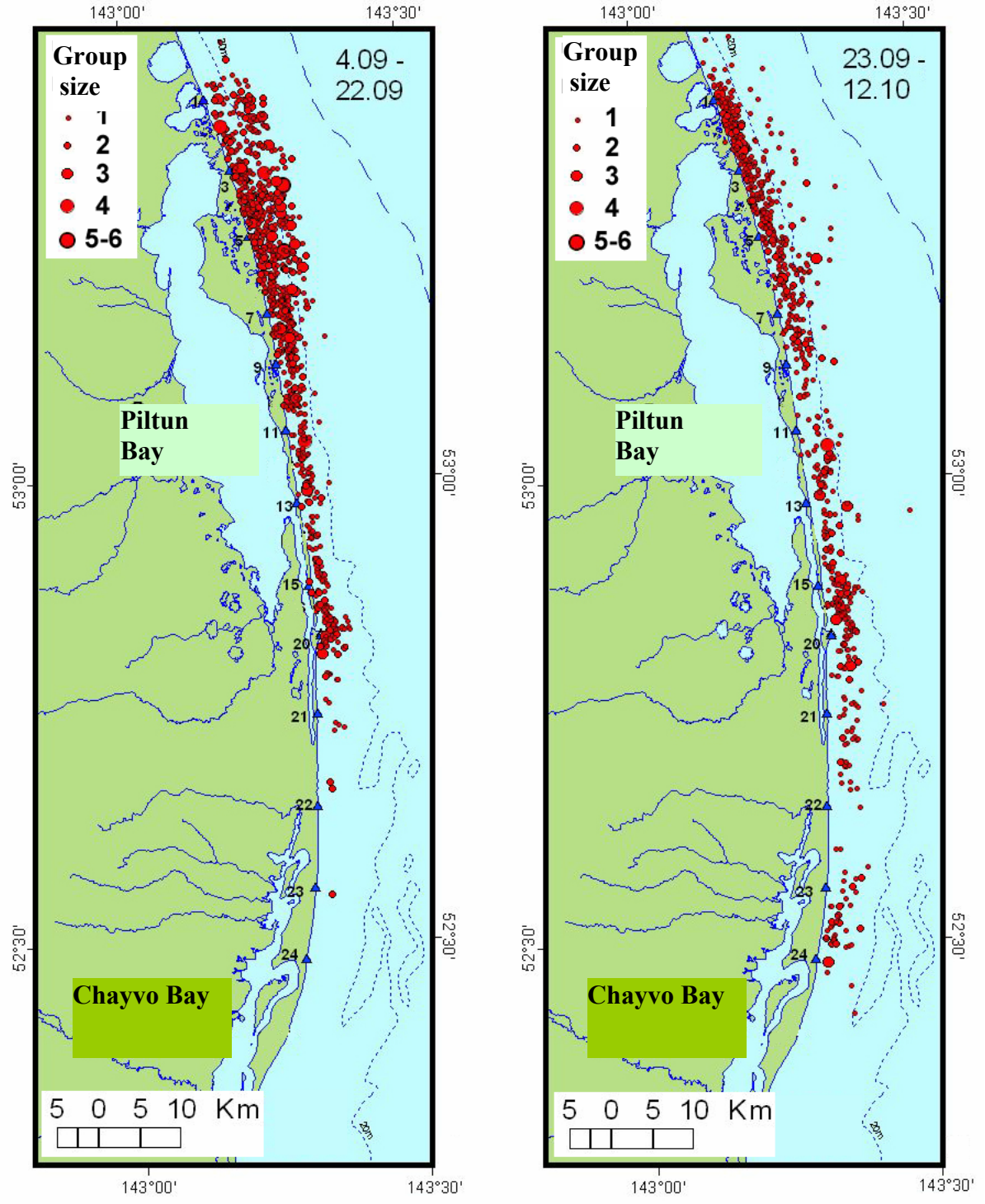


Figure 36. Gray whale distribution in the Piltun area before the appearance of the seismic exploration vessel (Spetember 4th – 22nd) and during the presence of the vessel and the support ship (September 23rd – October 12th).

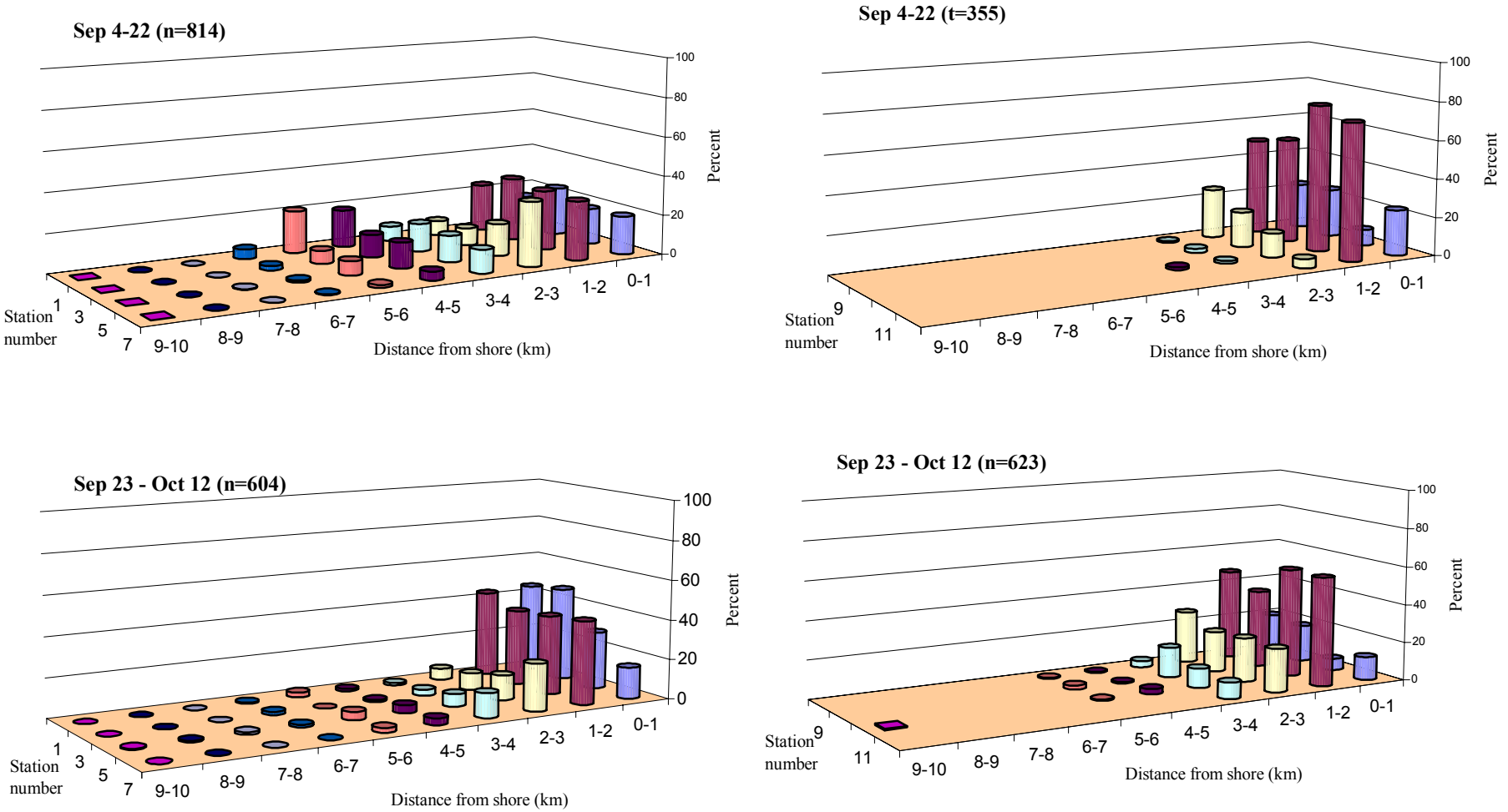
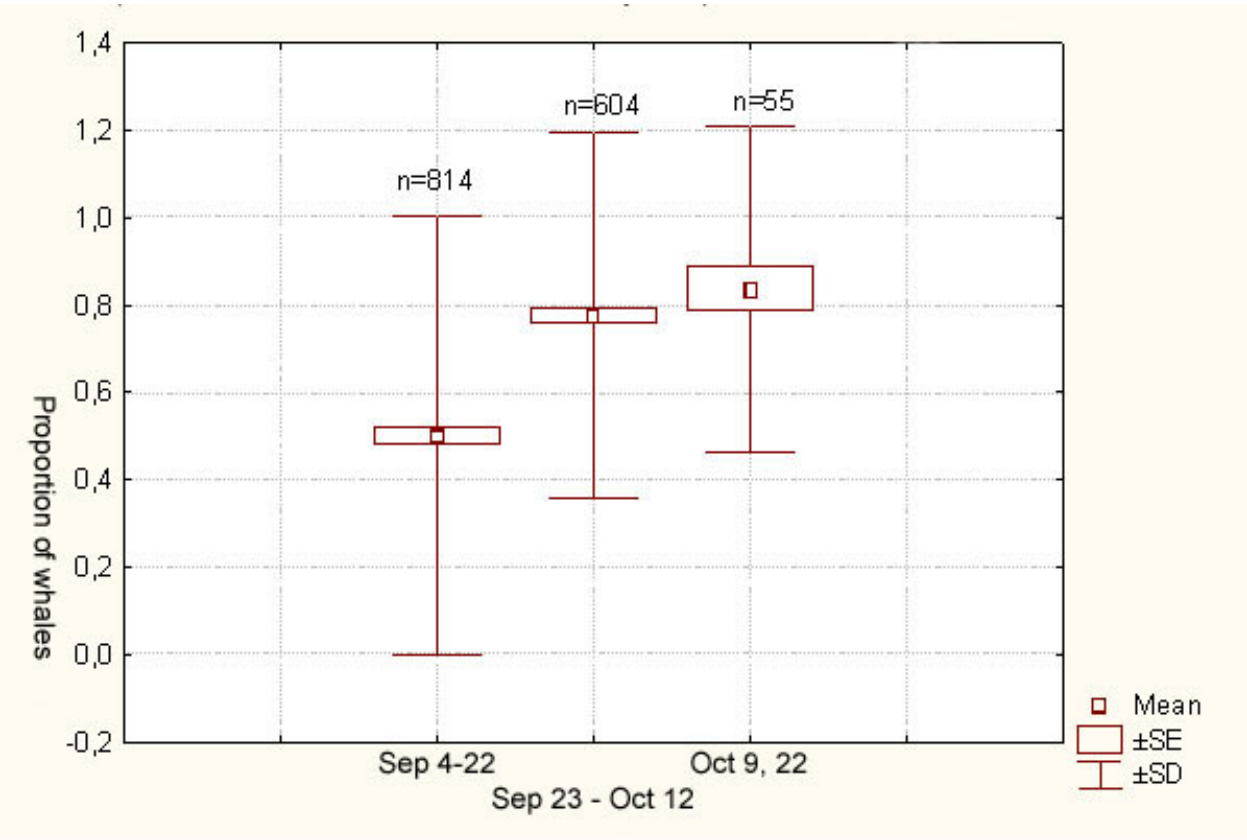
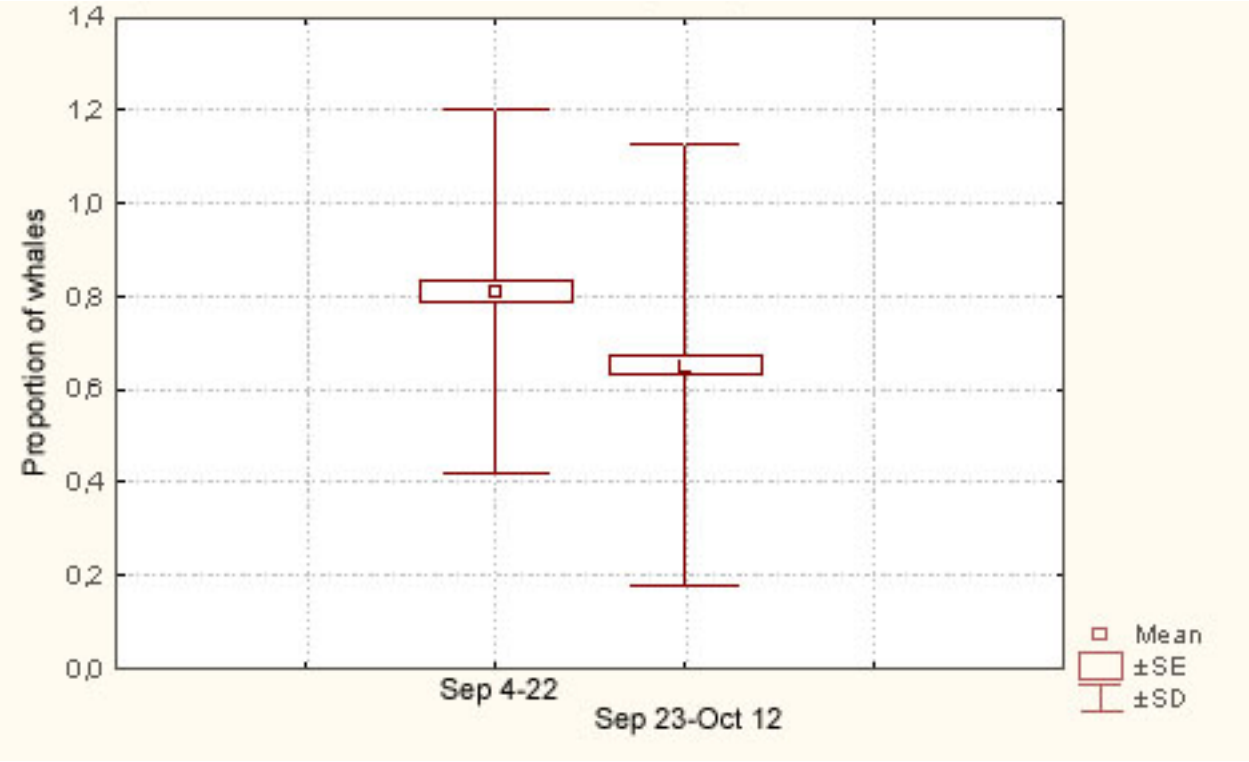


Figure 37. Gray whale distribution by distance from shore in the northern part of the Piltun Area before the appearance of the seismic exploration vessel (September 4-22) and during its work in the area (September 23 – October 12) (based on shore-based survey data).



	T-test for Independent Samples Note: Variables were treated as independent samples							
Group 1 vs. Group 2	Mean Group 1	Mean Group 2	t-value	df	p	Valid N Group 1	Valid N Group 2	Std.Dev. Group 1
Sep 4-22 vs. Sep 23-Oct 12	0,50	0,78	-10,98	1416	0,00	814	604	0,50
Sep 23-Oct 12 vs. Oct 9, 22	0,78	0,84	-1,03	657	0,30	604	55	0,42

Figure 38. Frequency of gray whale sightings within the 2-km coastal zone in the northern part of the Piltun Area (survey stations 1-7) before the appearance of the seismic exploration vessel (September 4-22) and during its work in the area (September 23 – October 12) (based on shore-based survey data).



	T-test for Independent Samples Note: Variables were treated as independent samples								
Group 1 vs. Group 2	Mean Group 1	Mean Group 2	t-value	df	p	Valid N Group 1	Valid N Group 2	Std.Dev. Group 1	Std.Dev. Group 2
Sep 4-22 vs. Oct 9-12	0,81	0,65	5,36	976	0,000	355	623	0,39	0,48

Figure 39. Frequency of gray whale sightings within the 2-km coastal zone in the central part of the Piltun Area (survey stations 9-15) before the appearance of the seismic exploration vessel (September 4-22) and during its work in the area (September 23 – October 12) (based on shore-based survey data).

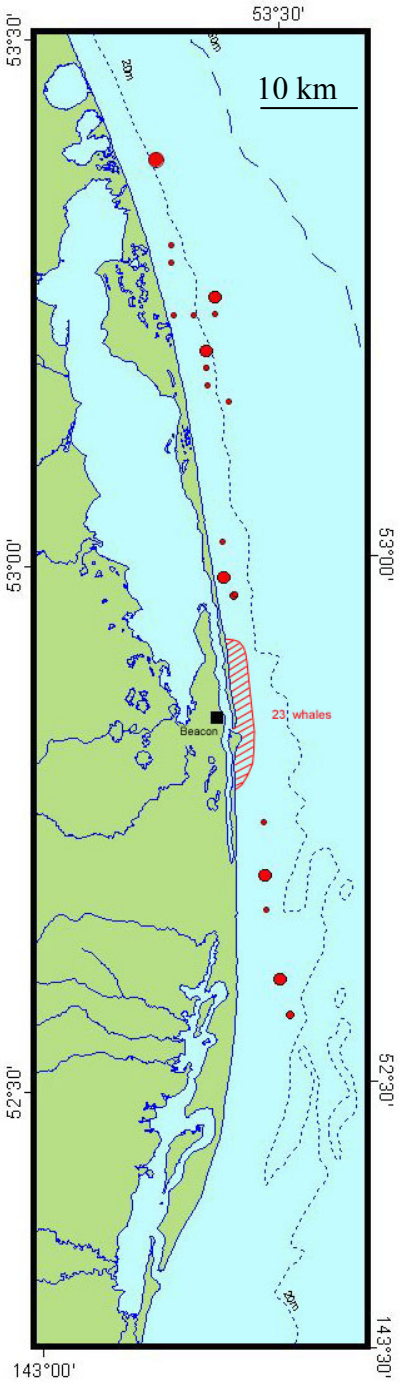


Figure 40. Gray whale distribution in the piltun area Augist 1st – 3rd, 1999, based on survey data from a vessel and from the Piltun lighthouse (Würsig et al., 1999). The map was plotted on coordinates of vessel whale sightings given in the report: the shaded water is the approximate location of 23 whales counted from the lighthouse.

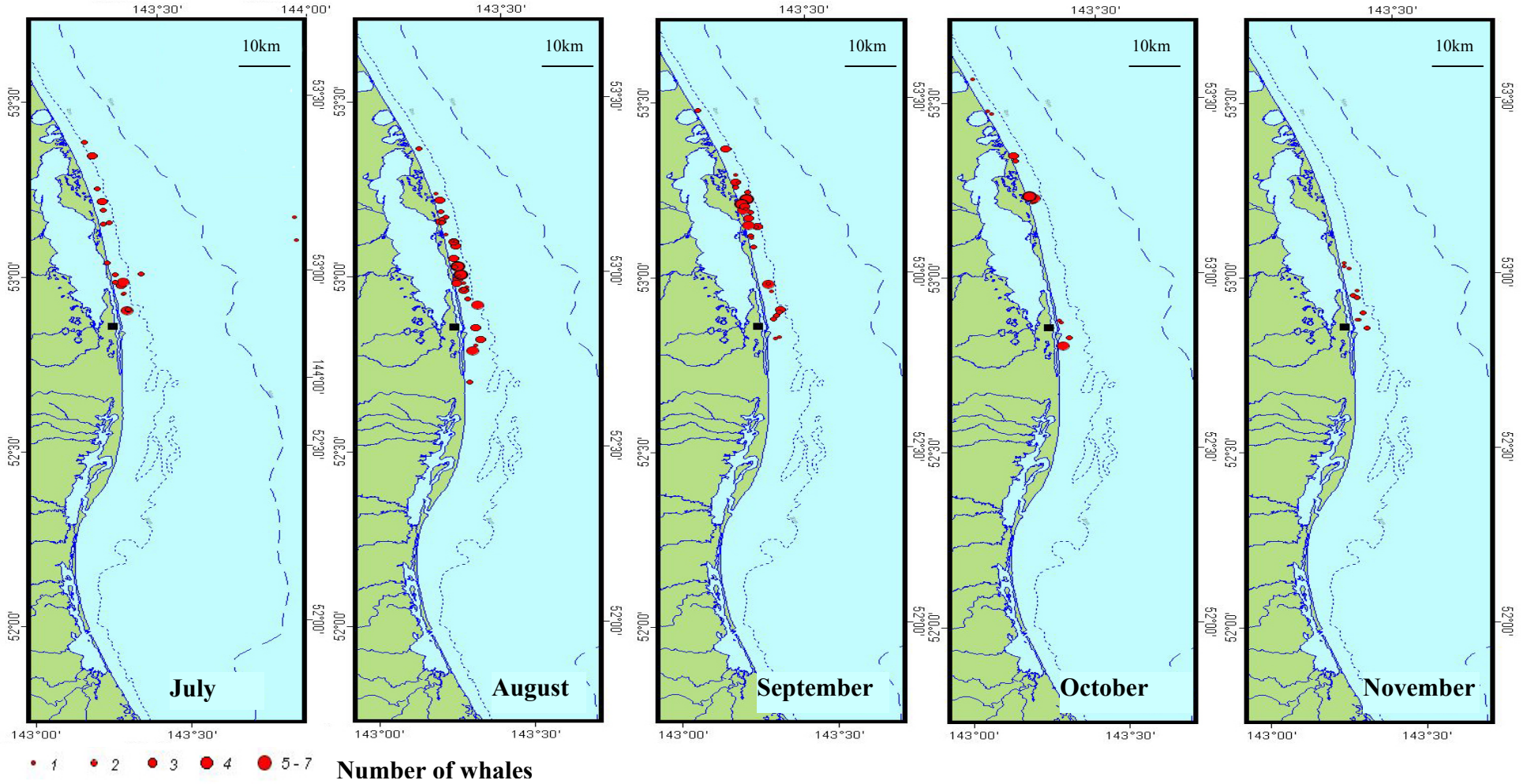


Figure. 41. Distribution of gray whales to in the Piltun area from July to October 1999 from aerial surveys (Sobolevsky, 2000). The plots above have been constructed using the coordinates of whale sightings contained in Sobolevsky (2000).

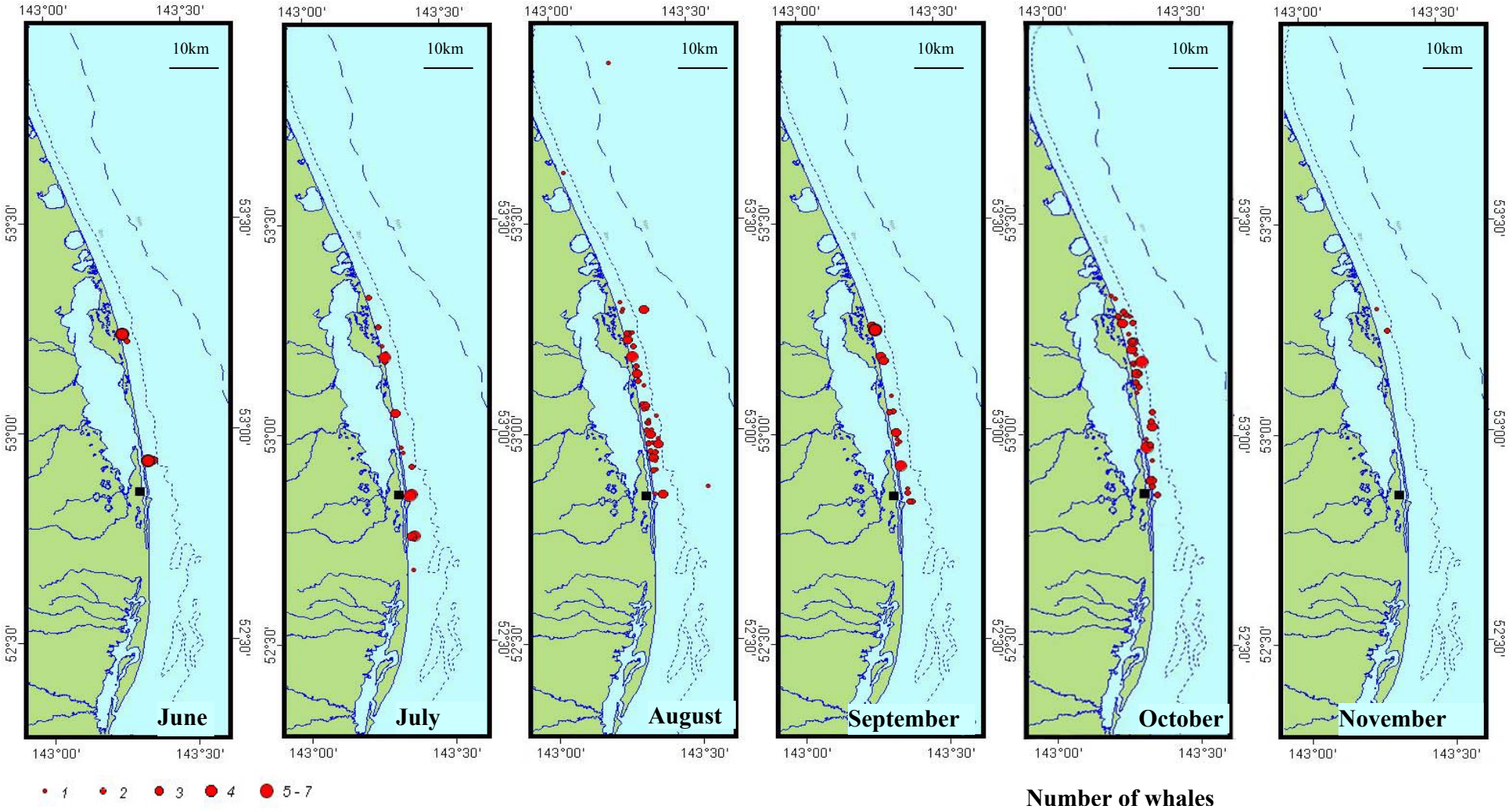


Figure. 42. Distribution of gray whales to in the Piltun area from July to October 2000 from aerial surveys (Sobolevsky, 2001). The plots above have been constructed using the coordinates of whale sightings contained in Sobolevsky (2001).

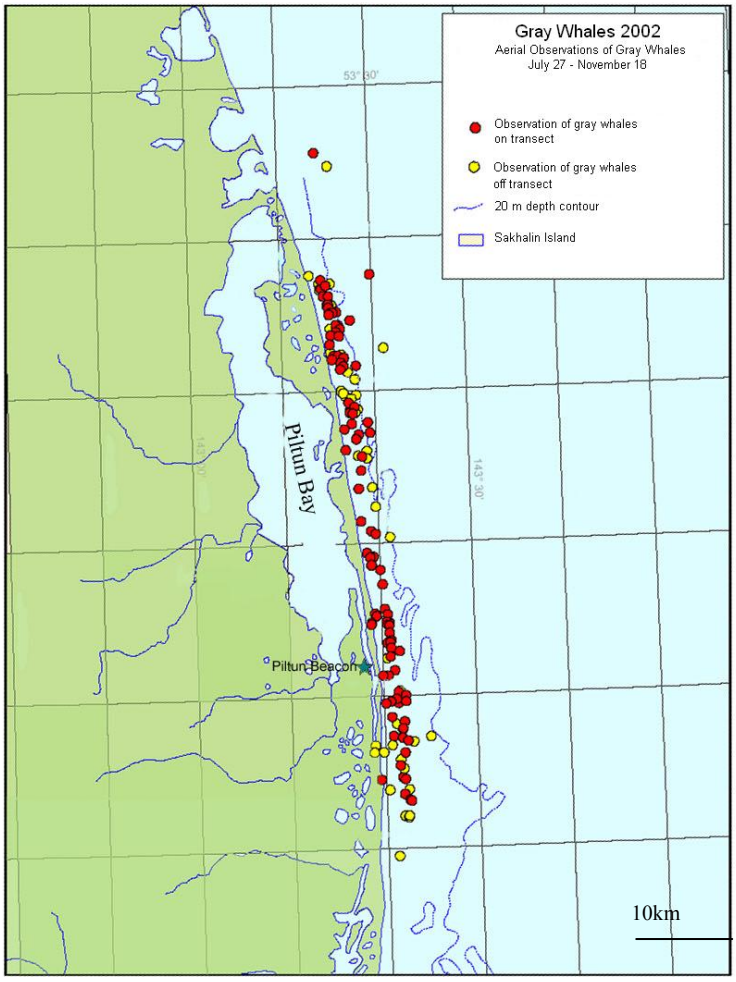


Figure. 43. Distribution of gray whales in the Piltun area from July - November 2002 using aerial surveys (Blokhin et al., 2003).

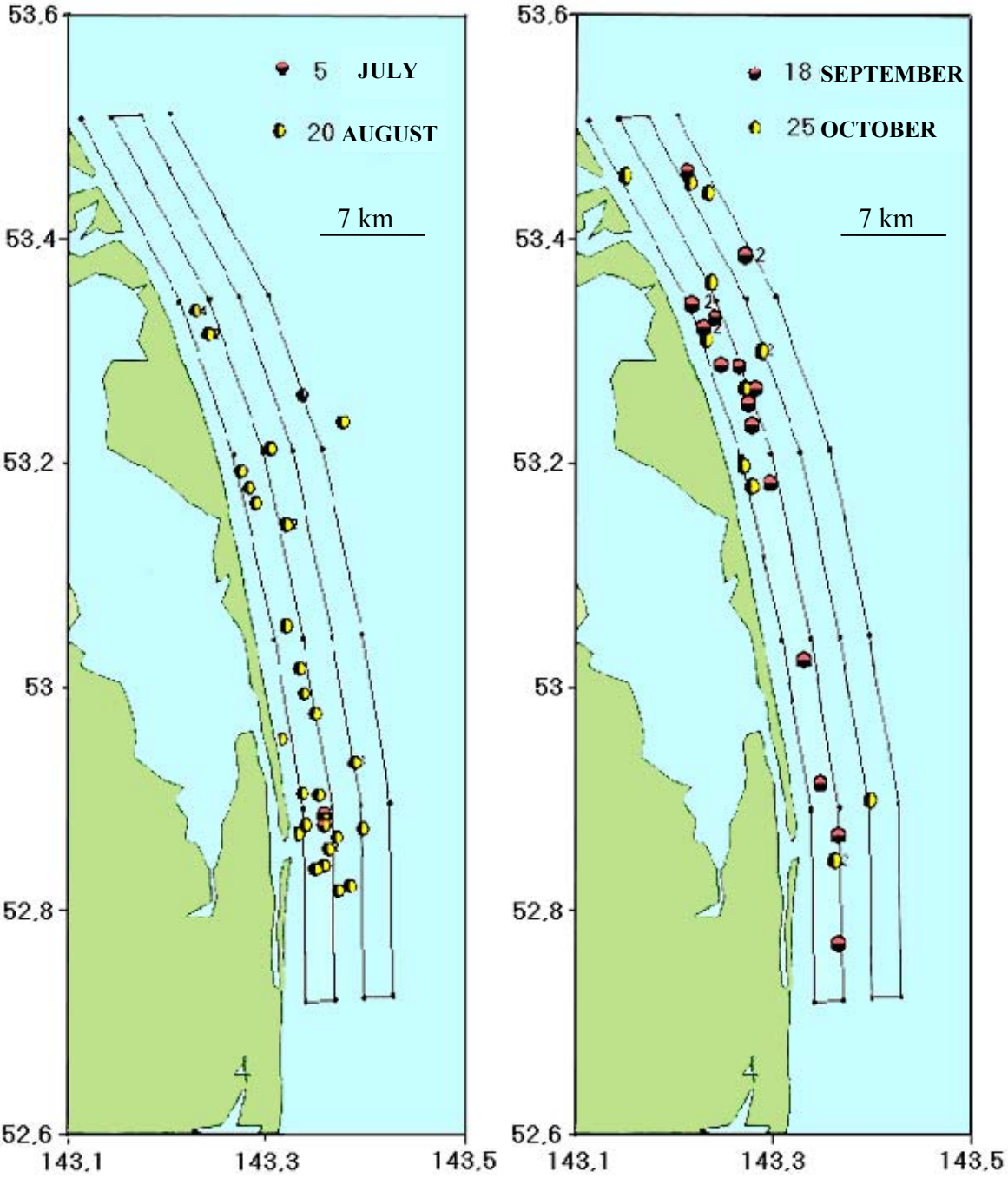


Figure 44. Distribution of gray whales in the Piltun area from July - October 2003 using aerial surveys (Blokhin et al., 2004).

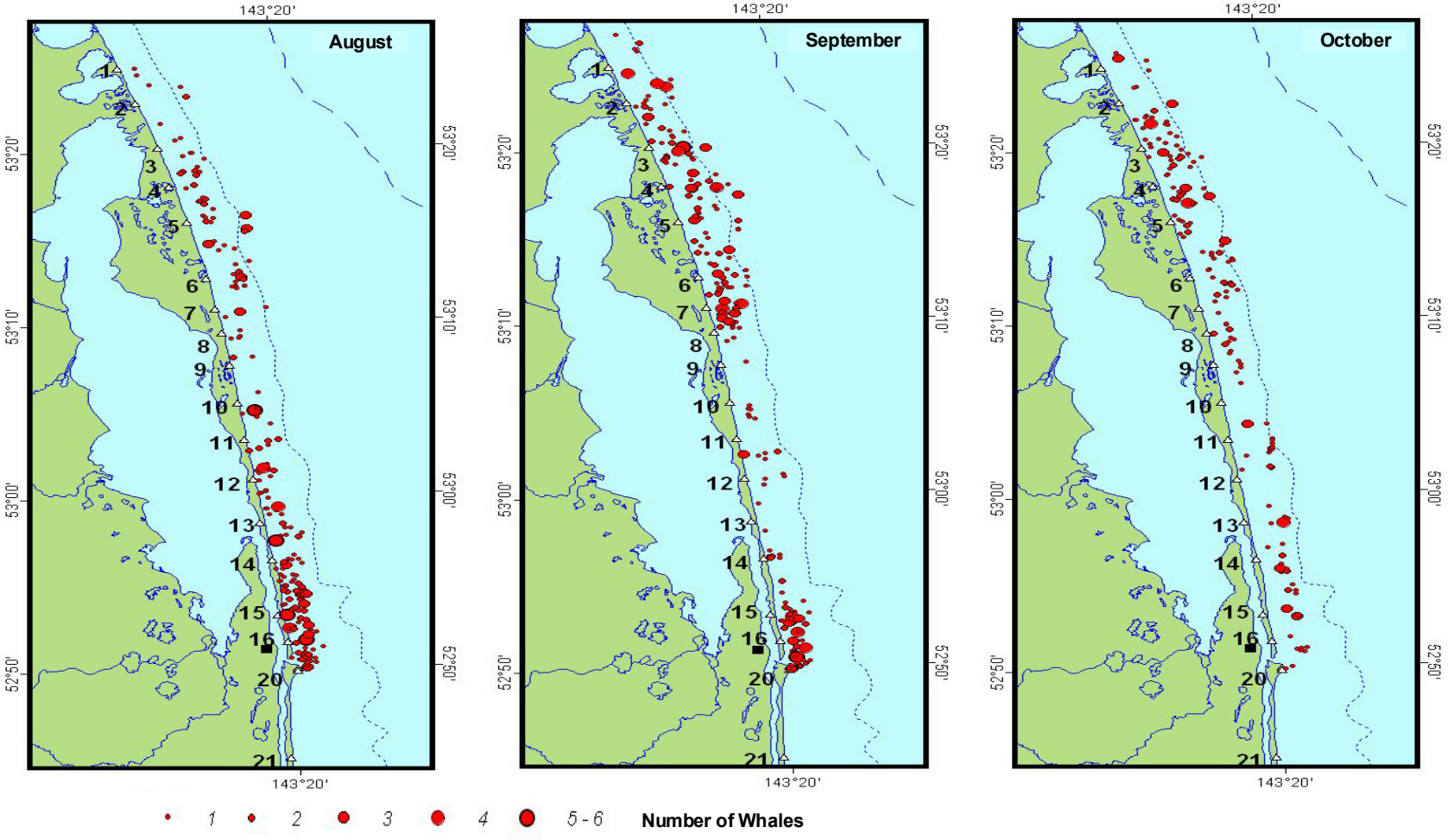
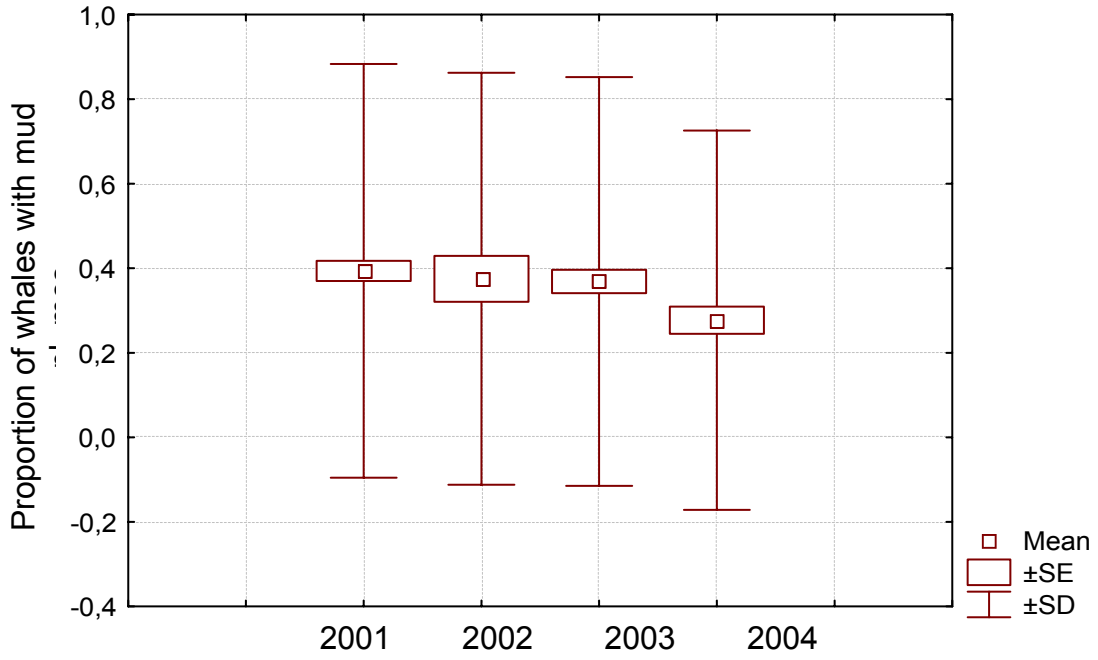


Figure 45. Distribution of gray whales from August to October, 2003 according using shore-based surveys (Melnikov and Starodymov, 2004) Plots have been produced using recalculated coordinates using the distance formula of Lerzak et Hobbs (1998).



Group 1 vs. group 2	Student Criterion						
	Av. group 1	Av. group 2	Value t	df	p	n group 1	n group 2
2003 vs. 2004	0.37	0.28	2.13	494	0.03	301	195

Figure 46. Characteristics of gray whale feeding activity in Piltun Area in July-October 2001-2004 (based on aerial survey data)

APPENDICES

Appendix 1. Sample form for recording marine mammals during vessel based surveys in 2004.

Attachment 1

Observation Data Coding Sheet

Date _____ (Day) July-October (Month) 2004 Ship Akademik Oparin Page

	Observer		Vessel Position							Time			Weather Conditions			Location		Marine Mammals											
			Latitude			Longitude							Visibility			Glare					Behavior		Clock Face		Initial Distance				
WS or WE	# 1	# 2	Deg.	Min.	Sec.	Deg.	Min.	Sec.	Ship's course	Hour	Min.	Sec.	Sea con-di-tions	km	Light or dark	Amt	Loca-tion	Spe-cies	Num-ber	Move-ment	Activ # 1	Activ # 2	From	To	Scale mark-ing	Meters	Signa-ture	Nature of move-ment	with top line

Marine mammal species
GW – gray whale
MW – Minke whale
UB – unknown Baleen whale
HP – harbor porpoise
DP – Dall porpoise
WW – white whale
PWSD – Pacific whitesided dolphin
UO – unknown Odontocete
UW – unknown whale
RS – ringed seal (akiba)
BS – bearded seal (lakhtak)
SS – spotted seal (largha)
SL – Steller sea lion
NF – northern fur seal
US – unknown seal

Movement
ST – toward ship
SP – parallel to ship
MI – wandering
NO – not moving
UN – unknown

Behavior
SI – Drifting, tail down
FD – diving headfirst
TH – diving with splash
DI – diving
LO – looking (seals)
SW – swimming
SH – looking around (whales)
BR – jumping out
FE – feeding
FL – diving vigorously with pectoral fin exposed
OT – other (describe)
UN – unknown

Intensity of movement
SE – calm
MO – moderate
VI – vigorous

Signature
BL – spout
BO – body
HE – head
FL – dorsal fin
SP – splash
SI – wake with ripples

Appendix 2. Whale Safety Protocols Vessel-Based Western Gray Whale Research and Monitoring Program 2004.

The purpose of this document is to recommend vessel procedures to help minimize disturbance of western gray whales from activities of industry-sponsored research vessels including the *Oparin* and zodiacs. Vessel-based research activities in 2004 will include vessel-based marine mammal surveys, gray whale prey sampling, photo-identification, and acoustics. These research activities have the potential to disturb western gray whales in their summer feeding grounds along the northeast coast of Sakhalin Island. Gray whales are vulnerable to disturbance both in their main feeding areas (Piltun and Offshore areas) as well as during their travel and feeding in all other areas along the Sakhalin coast.

Some visible signs of whale disturbance could include:

- "Fleeing" or rapidly traveling away from the vessel
- Changes in direction or speed of swimming
- Hasty dives
- Changes in respiration patterns
- Surface behaviors such as tail slashes/slaps/breeches
- Changes in activity, i.e., from resting to traveling or from foraging to traveling

Some potential results of disturbance include:

- Displacement from feeding areas
- Disruption of feeding
- Disruption of nursing
- Stress
- Injury (primarily from ship strikes)

Of particular concern is the size and maneuverability of the research ship, *Oparin* (75m long). This document recommends guidelines to minimize potential impacts from the *Oparin* when it is conducting vessel surveys and when supporting photo-identification and acoustics work. This document also recommends guidelines for zodiac use during photo-identification and prey sampling research. These guidelines are based on current worldwide regulations for whale-watching vessels as outlined by the International Whaling Commission (IWC) and the Sakhalin Energy Investment Company (SEIC) Western Gray Whale Protection Plan. Guidelines contained in this document should be considered adaptable and should be modified as a result of feedback from scientists working in the field.

General

i. **Priorities: Crew safety first, whale safety second, data LAST**

ii. Vessels, engines and other equipment should be maintained and operated during vessel activities to reduce, as far as practicable, adverse impacts on gray whales

iii. Propellers should be shrouded, if possible, to reduce noise and risk of injury to whales

iv. One ore more marine mammal observers (MMOs) should be on duty during daylight hours to keep track of all gray whales or other marine mammals in the proximity of all vessel activities.

v. Avoid sudden changes in speed, direction , or noise

vi. Do not pursue, head off, encircle whales, or cause groups of whales to separate

vii. Gray whales should be able to detect nearby vessels at all times. Attempts to eliminate all noise may result in whales being startled by a vessel whose approach was undetected. In addition, rough seas may elevate background noise to levels that may cause vessels to become less detectable by whales.

viii. Echosounders and sonar should not be used in the whale feeding area, unless their noise source levels and frequencies are outside the range that leads to disturbance to gray whales.

ix. Under no circumstances should whales be driven or their movements blocked by vessels.

Vessel-Based Surveys

i. Vessel surveys should be conducted along or offshore of the 20 m depth contour line.

ii. During vessel surveys, the *Oparin* should attempt under ideal circumstances to maintain a 1000m separation from gray whales or other large whales. However, due to the nature of the *Oparin*'s work (i.e., gray whale studies), the ship may need to be in close proximity to whales during vessel surveys in feeding areas. If any whale is heading for the vessel, the captain should take all necessary action to avoid a collision or close-quarter situation with the whale and attempt to **maintain at least a 500m minimum distance between the vessel and the whale**.

iii. MMOs recording whale sightings during surveys and vessel movements have the ability to communicate immediately with the vessel captain and have the authority to advise the captain to slow speeds, change course to deflect a whale(s), or stop the vessel. During vessel surveys in cases where the *Oparin* deflects course to avoid (a) whale(s), it should always deflect toward offshore.

iv. If possible, do not drive through or into a group of whales

v. If (a) whale(s) surface(s) in the vicinity of a vessel in transit (survey, movement between areas) take all care necessary to avoid collisions. This may include stopping, slowing down, and/or steering away from the whale.

vi. Under no circumstances should whales be driven or their movements blocked by vessels

vii. Speed limits should apply during vessel surveys. The *Oparin* should travel no faster than 10kts (~18.5 km/hr) during the Piltun vessel survey and 7 kts (~13 km/hr) during the Offshore survey. In both areas, speeds should be reduced to 4-5kts (~9 km/hr) when groups of gray whales are expected to enter the 1 km safety zone. This speed (4-5 kts) was the speed of the 82-m-long seismic ship during the Odoptu seismic survey in 2001, thus these vessel speeds are reasonable within the

feeding areas and when traveling near gray whales or during conditions of reduced visibility, without seriously disrupting the scientific goals of the vessel-based program.

viii. When traveling between areas, the *Oparin* should transit outside of known feeding areas. Where feasible, the *Oparin* should remain outside the boundaries of known feeding areas during periods of reduced visibility (<1 km) and during the night. In the Piltun feeding area, the *Oparin* should not enter waters shallower than 20m during periods of reduced visibility (<1 km) or during the night. If traveling through the Offshore feeding area in reduced visibility (<1 km), the speed limit should be up to a maximum of 5kts.

Oparin support of workboats (acoustics, prey sampling, photo-identification zodiacs)

i. When workboats are in the Piltun feeding area, the *Oparin* should remain ***parallel and offshore*** of the workboat activities at a distance of ~1 km, i.e., away from aggregations of feeding gray whales. In the Offshore area, the *Oparin* should maintain a position parallel to workboats activities and remain ~1 km from aggregations of whales. *Under no circumstances* should the *Oparin* follow *behind* the workboats through a group of feeding whales. The *Oparin* should not approach whales, feeding or otherwise within 1 km.

ii. When deploying and retrieving acoustic buoys in the Piltun feeding area, the *Oparin* should travel parallel to shore seaward of the 20 m depth contour and slow to max. 4-5 kts (max. ~9.3 km/hr) when a buoy is directly perpendicular between the vessel and shore. At this time, MMOs should report any sightings of gray whales visible from the *Oparin*.

If gray whales are NOT SIGHTED within one (1) km shoreward of the 20 m depth contour, the *Oparin* could then slowly (max. 4-5 kts, or slower if necessary) travel directly perpendicular to shore to deploy or retrieve a buoy. Once the decision is made to enter the <20 m depth zone the *Oparin* should maintain a 1 km distance from observed gray whales. This may include stopping, slowing down, and/or steering away from the whale. The *Oparin* will then travel slowly (max. 4-5 kts or slower if necessary) perpendicular from shore back to the 20 m depth contour and then could continue at 7-10 kts (9.3-16 km/hr) along a course parallel to the 20 m contour.

If gray whales ARE SIGHTED within 1 km shoreward of the *Oparin* at the 20 m depth contour, then a zodiac could be deployed from the *Oparin* at the 20 m depth contour and travel perpendicular to shore to deploy or retrieve the buoy. The zodiac will then travel perpendicular to shore at max 4-5 kts (or slower if necessary) back to the 20 m depth contour, be retrieved by the *Oparin* and the *Oparin* could continue at 7-10 kts along a course parallel to the 20 m depth contour to the proximity of the next acoustic station, and repeat this procedure.

iii. Deploy and retrieval of buoys in the Piltun area in waters <20m deep should only be conducted during daylight hours in periods of good visibility (>1 km).

iv. When traveling within the Piltun feeding area in waters < 20 m deep where no whales are present (within 1 km), the *Oparin* should not travel faster than 7 kts (during daylight hours when visibility is good for at least 1km). The *Oparin*

should not enter waters <20 m deep during night time, during periods of reduced daytime visibility (<1 km), or when whales are within 1km of the vessel.

Prey Sampling from the *Oparin*

i. During gray whale prey sampling missions, the *Oparin* should not approach whales, feeding or otherwise, closer than 1 km. Prey sampling should only be conducted in an area after the whale has moved at least 1 km from the ship. While prey samples are being collected, the vessel should anchor and not use bowthrusters to maintain position.

ii. Control length of exposure to ~1 hour. Limit sampling near whales with calves or whales with visible health indicators, such as skin sloughing and thinness.

iii. Speed limits should apply during prey sampling. When traveling within the Piltun feeding area in waters <20 m deep, the *Oparin* should not travel faster than max. 4-5 kts (max. ~9.3 km/hr), or slower if necessary, during daylight hours when visibility is at least 1 km. The *Oparin* should not enter waters <20 m deep during night time, during periods of reduced daytime visibility (<1 km), or when whales are expected to come within 1 km of the vessel.

Photo-ID from the zodiac

i. The zodiac should be in regular contact with the *Oparin* to relay information on all whales visible in the area

ii. Always drive the zodiac in such a manner to maintain crew and whale safety. Keep photographic gear protected from water exposure at all times.

iii. Avoid sudden changes in zodiac speed, direction, or noise (except in an emergency where there is risk to crew)

iv. Do not pursue, head off, encircle whales, or cause groups to separate

v. Do not drive into or through a group of whales

vi. Do not drive in circles around animals

vii. Do not reverse outboard motor near whales (except in emergency or risk to zodiac crew)

viii. Avoid excess outboard motor use, gear changes, maneuvering or backing up near whales

ix. Control length of exposure (i.e. during zodiac sessions, prey sampling), especially in the presence of mother/calf pair, juveniles, and whales with visible health indicators, such as skin sloughing and thinness, to a maximum 30 minutes to photograph 1st side, and an additional 15-20 minutes for the second side and flukes.

x. Approach whales from an oblique angle, i.e., parallel to and slightly from the rear and do not approach whales from directly behind (except briefly during a photo-identification fluke shot) and never drive towards a whale from the front. Travel

parallel to whales matching its speed and do not approach the animal closer than 50m for a photo-identification shot.

xi. Alternately, position the zodiac in neutral ahead and to the side of the whale and let it approach you

xii. Never approach animals at speeds faster than the slowest whale

xiii. If a calf approaches the zodiac, keep the outbound motor in neutral until the whale is a safe distance from the zodiac (~50m)

xiv. When first approaching a group of whales, gradually slow to neutral at a distance of 500m and assess group size, and activity patterns before attempting photo-id

xv. After initial assessment at 500m, slowly increase to "no wake" speed to position boat for initiating photo-id

xvi. When approaching a whale(s), slow down and try to maintain minimum distance of 300m

xvii. When within 300m move at constant slow "no wake" speed (max. 4-5 kts), except during set-up for photo-identification shots, when the zodiac should travel no faster than the slowest whale

xviii. When the zodiac is stationary the outboard motors should be put in neutral

xix. Do not turn vessel off – stay in neutral/idle – the noise lets the whale know where the vessel is

xx. The zodiac should be in neutral when stopped and when whales are at the surface in proximity to the zodiac

xxi. Before moving out of neutral, wait for the whale(s) to come to the surface and then dive to gain an understanding of where they are. Once this is established, engage motors when the whales are in a feeding dive

xxii. Insure that the zodiac does not drift too close to the whale(s) when in neutral

xxiii. If disturbance of a whale(s) is observed, withdraw immediately at slow "no wake" speed (max. 4-5 kts)

xxiv. When leaving a whale or group of whales, move at slow "no wake" speed (max. 4-5 kts) to the outer limit of the caution zone (500 m) before *gradually* increasing speed

xxv. Avoid engaging propellers within 50 m of whales – only engage outboards with extreme caution and awareness of the location of the whales

xxvi. If a whale approaches the zodiac, place engines in neutral and let whale come to you; or slow down and continue on course avoiding potential collisions; or steer a straight course away from the whales

xxvii. There should be communication between photo-id teams (shore-based, vehicle and behavior teams and US-Russian photo-ID team) to minimize double disturbance to the whales on the same day in the same area.

Appendix 3. Meteorological conditions on the coast of northeast Sakhalin Island in the Odoptu Bay area in July – October, 2004 (11:00 hrs daily).

Date	Visibility, (Км)	Wind Dir. (deg.).	Wind Speed (m/s)	Temp. (°C)	**Date**	Visibility (Км)	Wind Dir. (deg.).	Wind Speed (m/s)	Temp. (°C)
1 .07	0,5	30	4	5,4	**1 .08**	20	280	8	16,7
2 .07	10	60	6	7,2	**2 .08**	20	190	4	20,2
3 .07	4	96	6	7,4	**3 .08**	20	40	2	15,4
4 .07	20	20	2	8,4	**4 .08**	4	130	5	12,3
5 .07	20	30	3	11,7	**5 .08**	20	270	20	11,1
6 .07	20	40	4	11,7	**6 .08**	20	290	10	19,1
7 .07	20	80	1	13	**7 .08**	20	140	4	12,9
8 .07	20	120	5	14	**8 .08**	20	110	3	15,1
9 .07	20	70	5	9,1	**9 .08**	2	50	10	9,5
10 .07	20	340	6	9,6	**10 .08**	2	350	9	8,3
11 .07	20	350	5	12,4	**11 .08**	0,5	60	3	8,5
12 .07	20	140	4	20	**12 .08**	0,5	120	3	9,5
13 .07	20	260	4	21,8	**13 .08**	20	190	7	12,6
14 .07	20	20	1	15,2	**14 .08**	0,5	360	3	9,4
15 .07	20	20	6	12,1	**15 .08**	10	60	5	8
16 .07	10	140	8	10,2	**16 .08**	20	210	3	9,2
17 .07	0,5	100	5	7,5	**17 .08**	20	270	4	17,6
18 .07	10	340	7	9,4	**18 .08**	20	40	3	11,6
19 .07	20	310	6	12,2	**19 .08**	10	350	3	8,9
20 .07	20	140	3	13,1	**20 .08**	4	130	4	8,9
21 .07	20	80	2	12,2	**21 .08**	0,5	30	2	8,5
22 .07	20	140	7	10,4	**22 .08**	20	270	2	18
23 .07	0,5	150	9	7,1	**23 .08**	10	180	7	15,9
24 .07	0,5	340	4	9,1	**24 .08**	0,5	360	10	8,3
25 .07	20	290	6	13,3	**25 .08**	20	320	9	13,2
26 .07	20	250	5	22,7	**26 .08**	0,5	340	6	9,9
27 .07	20	140	5	14,7	**27 .08**	10	50	2	9,3
28 .07	0,5	110	4	11	**28 .08**	0,5	130	4	9,3
29 .07	0,5	150	6	10,4	**29 .08**	20	200	3	17,3
30 .07	4	160	7	12,3	**30 .08**	20	170	4	16
31 .07	20	230	6	20	**31 .08**	0,5	100	3	9,6
Average			**4,9**	**12,1**				**5,3**	**12,3**

Appendix 3.

Date	Visibility, (Км)	Wind Dir. (deg.).	Wind Speed (m/s)	Temp. (°C)	**Date**	Visibility (Км)	Wind Dir. (deg.).	Wind Speed (m/s)	Temp. (°C)
1 .09	4	60	14	9,1	**1 .10**	20	230	3	4,8
2 .09	2	340	7	8,4	**2 .10**	4	250	12	6,5
3 .09	10	300	9	11,3	**3 .10**	20	250	6	3,5
4 .09	20	290	7	14	**4 .10**	20	200	6	3,3
5 .09	20	290	5	17,3	**5 .10**	20	310	4	6,8
6 .09	10	150	3	12,9	**6 .10**	20	280	3	7,6
7 .09	20	310	3	11,5	**7 .10**	20	290	2	6
8 .09	20	10	3	9,6	**8 .10**	20	290	3	7,4
9 .09	4	320	6	9,1	**9 .10**	20	270	5	5,4
10 .09	20	260	7	13,4	**10 .10**	20	-	0	8,1
11 .09	20	220	2	13,1	**11 .10**	20	180	8	11,3
12 .09	4	300	3	12,5	**12 .10**	10	180	5	8,6
13 .09	20	280	6	13,4	**13 .10**	10	10	5	7,1
14 .09	20	200	2	12,1	**14 .10**	20	230	8	2
15 .09	20	230	7	15,8	**15 .10**	4	210	6	4,8
16 .09	20	70	4	9,3	**16 .10**	10	300	10	1,3
17 .09	20	160	10	9,1	**17 .10**	10	290	7	0,4
18 .09	10	160	5	13,3	**18 .10**	20	310	6	3,7
19 .09	20	260	6	12,5	**19 .10**	20	230	3	2,1
20 .09	20	270	9	12,3	**20 .10**	10	70	9	3,3
21 .09	20	270	8	12	**21 .10**	20	330	6	1
22 .09	20	270	6	18	**22 .10**	20	110	3	0,4
23 .09	20	360	5	11,2	**23 .10**	20	90	8	3,3
24 .09	20	190	4	13	**24 .10**	4	170	1	-0,3
25 .09	0,5	170	5	10,4	**25 .10**	4	80	3	-0,5
26 .09	10	170	7	10,1	**26 .10**	4	20	6	0,5
27 .09	20	150	6	11,2					
28 .09	10	150	8	11,6					
29 .09	20	200	6	10					
30 .09	20	310	6	9					
Average			**6,0**	**11,9**				**5,3**	**4,2**

Appendix 4. Coordinates and number of gray whales recorded during aerial surveys in the Piltun Area in July-November 2004.

Date	Longitude	Latitude	No.	Date	Longitude	Latitude	No.
Jul 4	143,237085	53,357039	1	Jul 31	143,288679	53,185222	1
Jul 4	143,318013	53,118237	1	Jul 31	143,286570	53,185222	1
Jul 4	143,324284	53,091082	1	Jul 31	143,298441	53,197040	1
Jul 4	143,337550	53,040050	1	Jul 31	143,278819	53,197040	1
Jul 4	143,337550	53,040050	1	Jul 31	143,261067	53,241270	2
Jul 4	143,358471	52,944848	2	Jul 31	143,272495	53,241270	5
Jul 4	143,365906	52,874086	1	Jul 31	143,238691	53,312042	2
Jul 4	143,365906	52,874086	1	Jul 31	143,194975	53,378599	1
Jul 4	143,365579	52,865374	1	Jul 31	143,290058	53,172809	1
Jul 4	143,366448	52,780868	0	Aug 1	143,161820	53,428190	1
Jul 4	143,344878	52,823639	1	Aug 1	143,231740	53,369210	1
Jul 4	143,331939	52,898494	1	Aug 1	143,245280	53,288890	1
Jul 4	143,326253	52,936721	2	Aug 1	143,327770	53,112980	1
Jul 4	143,272963	53,186016	1	Aug 1	143,365970	52,936060	1
Jul 4	143,265308	53,201369	1	Aug 1	143,739730	52,008160	1
Jul 4	143,391500	53,067892	1	Aug 1	143,316730	53,082030	6
Jul 4	143,403473	53,019800	1	Aug 1	143,308230	53,100150	2
Jul 4	143,417067	52,939838	2	Aug 1	143,270490	53,151270	2
Jul 4	143,372220	53,015218	2	Aug 1	143,266530	53,166590	1
Jul 4	143,339288	53,142747	2	Aug 1	143,228510	53,321260	1
Jul 4	143,300611	53,192384	1	Aug 1	143,226970	53,322320	1
Jul 4	143,307617	53,154243	1	Aug 1	143,268330	53,159110	2
Jul 4	143,310342	53,139946	1	Aug 1	143,318970	53,107130	2
Jul 4	143,310342	53,139946	1	Aug 1	143,354580	52,952950	1
Jul 4	143,324509	53,080332	1	Aug 1	143,303190	53,114780	1
Jul 4	143,338044	53,020588	1	Aug 1	143,305410	53,122680	5
Jul 4	143,339052	53,013947	1	Aug 1	143,302540	53,136770	2
Jul 4	143,361272	52,917892	1	Aug 1	143,291540	53,169680	1
Jul 4	143,363391	52,906015	1	Aug 1	143,246390	53,309850	1
Jul 4	143,367988	52,873340	1	Aug 1	143,214010	53,423210	1
Jul 31	143,229469	53,453134	1	Aug 1	143,180610	53,431230	2
Jul 31	143,350068	52,927070	1	Aug 1	143,146660	53,486400	1
Jul 31	143,352256	53,017482	1	Sep 22	143,320314	53,073251	1
Jul 31	143,288402	53,208638	1	Sep 22	143,299148	53,137516	1
Jul 31	143,280175	53,254654	1	Sep 22	143,296038	53,149914	1
Jul 31	143,261411	53,396709	1	Sep 22	143,312603	53,186746	1
Jul 31	143,261172	53,257545	6	Sep 22	143,301971	53,199325	1
Jul 31	143,286288	53,188478	2	Sep 22	143,293012	53,199325	4
Jul 31	143,285281	53,178860	2	Sep 22	143,284465	53,211406	1
Jul 31	143,297842	53,178860	1	Sep 22	143,274428	53,234564	1
Jul 31	143,318739	53,164489	1	Sep 22	143,224650	53,330576	1
Jul 31	143,293035	53,135312	2	Sep 22	143,214918	53,345028	1
Jul 31	143,297931	53,135312	1	Sep 22	143,205189	53,345028	1
Jul 31	143,298794	53,126096	2	Sep 22	143,247660	53,345028	1
Jul 31	143,336854	52,953056	1	Sep 22	143,215624	53,356621	1
Jul 31	143,345308	52,920547	1	Sep 22	143,240763	53,381678	2
Jul 31	143,362697	52,850123	1	Sep 22	143,270738	53,212559	2
Jul 31	143,338562	52,951886	1	Sep 22	143,376220	52,894535	1

Jul 31	143,317347	52,959402	1	Sep 22	143,417366	52,781501	1
Jul 31	143,297021	53,128552	2	Sep 23	143,307552	53,216153	1
Jul 31	143,283879	53,138391	2	Sep 23	143,308234	53,159505	1
Sep 23	143,355638	52,920461	1	Oct 22	143,230950	53,307750	1
Sep 23	143,346336	52,900763	1	Oct 22	143,218510	53,295570	1
Sep 23	143,349974	52,907217	1	Oct 22	143,246480	53,235160	1
Sep 23	143,353170	52,919383	1	Oct 22	143,259540	53,224470	1
Sep 23	143,351190	53,017214	1	Oct 22	143,293380	53,132700	1
Sep 23	143,306449	53,124315	1	Oct 22	143,424090	52,711280	1
Sep 23	143,298169	53,134813	1	Oct 22	143,373190	52,886590	1
Sep 23	143,326666	53,146614	1	Oct 22	143,366010	52,900240	1
Sep 23	143,300081	53,185249	1	Oct 24	143,265740	53,225670	1
Sep 23	143,270410	53,228529	1	Oct 24	143,351700	52,882530	2
Sep 23	143,243912	53,248013	1	Oct 24	143,321970	52,535830	2
Sep 23	143,266856	53,275505	2	Oct 24	143,509420	52,383900	1
Sep 23	143,251909	53,275505	1	Oct 24	143,557530	52,203670	2
Sep 23	143,242197	53,275505	2	Oct 24	143,648050	52,180870	1
Sep 23	143,253127	53,302279	1	Oct 24	143,660610	52,159230	1
Sep 23	143,241765	53,316157	1	Oct 24	143,273100	53,290190	1
Sep 23	143,232426	53,327100	1	Oct 24	143,226760	53,293290	1
Sep 23	143,213520	53,344958	3	Oct 24	143,239470	53,275760	2
Sep 23	143,348120	52,892303	1	Oct 24	143,267160	53,216040	1
Oct 19	143,179052	53,418247	1	Oct 24	143,743750	52,162270	1
Oct 19	143,164973	53,411783	1	Oct 24	143,348060	52,892850	1
Oct 19	143,173812	53,404428	1	Nov 15	143,160330	53,455110	1
Oct 19	143,212768	53,329402	2	Nov 15	143,177680	53,395470	1
Oct 19	143,217469	53,314446	1	Nov 15	143,206080	53,380320	1
Oct 19	143,247809	53,290488	1	Nov 15	143,223930	53,354820	1
Oct 19	143,237352	53,261585	1	Nov 15	143,356450	53,079070	2
Oct 19	143,266901	53,205103	1	Nov 15	143,348570	52,854300	3
Oct 19	143,262440	53,188779	1	Nov 15	143,308630	53,086150	1
Oct 19	143,333366	52,960716	1	Nov 15	143,289580	53,167170	1
Oct 19	143,338017	52,811902	2	Nov 15	143,326420	53,270920	1
Oct 19	143,354465	52,967749	1	Nov 15	143,201930	53,342570	1
Oct 19	143,321124	53,130468	1	Nov 15	143,162680	53,461850	1
Oct 19	143,262535	53,282983	3	Nov 15	143,166320	53,490920	1
Oct 19	143,262037	53,329461	1	Nov 15	143,172810	53,409140	1
Oct 19	143,412385	52,695075	1	Nov 15	143,336080	52,909600	1
Oct 19	143,297699	53,312809	1	Nov 15	143,403750	52,797720	1
Oct 19	143,269144	53,184401	1	Nov 15	143,118210	53,503630	2
Oct 19	143,221899	53,315379	1	Nov 21	143,257930	53,191030	1
Oct 19	143,213438	53,324327	1	Nov 21	143,328830	52,980400	2
Oct 19	143,203216	53,343102	2	Nov 21	143,332960	52,921200	1
Oct 19	143,214450	53,343102	1	Nov 21	143,337880	52,913620	1
Oct 19	143,172390	53,388973	1	Nov 21	143,330890	53,003180	1
Oct 19	143,160899	53,421262	1	Nov 23	143,195980	53,375200	1
Oct 21	53,404520	143,181760	1	Nov 23	143,219650	53,334530	1
Oct 21	53,265973	143,242954	1	Nov 23	143,294750	53,208980	1
Oct 21	53,193424	143,271241	1	Nov 23	143,297900	53,181870	2
Oct 21	52,629860	143,338920	1	Nov 23	143,321960	53,162720	1
Oct 21	52,549170	143,385650	1	Nov 23	143,286820	53,131400	2
Oct 21	52,546040	143,334200	2	Nov 23	143,354490	52,913660	1
Oct 21	52,585860	143,341320	1	Nov 23	143,350930	52,890720	1

Oct 21	53,350100	143,204260	1	Nov 23	143,312980	53,146810	1
Oct 21	53,373260	143,186950	1	Nov 23	143,295360	53,158820	1
Oct 21	53,416870	143,159350	1	Nov 23	143,253090	53,289370	1
Oct 22	143,200830	53,370640	1	Nov 23	143,232290	53,338440	1
Oct 22	143,190080	53,370640	1	Nov 23	143,207250	53,338440	1

Appendix 5. Coordinates and numberr and coordinates of all gray whale sightings during the aerial surveys in the Offshore area, 2004.

(Inclination of observation 10-140%)

Date	Latitiude N.	Longitude E	number
4 July	52,105322	143,557304	2
1st August	52,008162	143,733702	1
23rd September	52,392350	143,604741	1
23rd September	52,197102	143,644572	2
24th October	52,383900	143,514600	1
25th October	52,203670	143,557530	2
26th October	52,180870	143,648050	1
27th October	52,159230	143,646220	1
28th October	52,162270	143,733660	1

Appendix 6. Coordinates and number of other cetacean species recorded during aerial surveys of the offshore area, 2004.

(Inclination of observation 10-140%)

Date	Latitiude N.	Longitude E	number	Number
Minke	1st August	52,021798	143,688533	1
Minke	1st August	51,794524	143,645623	1
Minke	1st August	51,799614	143,597467	2
Minke	1st August	52,356876	143,471940	1
Minke	22nd September	53,156018	143,402513	2
Minke	23rd September	51,802812	143,566396	1
Minke	23rd September	51,819763	143,562657	1
Minke	23rd September	53,432393	143,341396	1
Minke	23rd September	53,489503	143,154538	1
Killer	1st August	52,918847	143,330340	4
Unknown.	1st August	52,420707	143,513852	1
Unknown.	15th November	52,797723	143,396468	1

Appendix 7. Coordinates and number of gray whales and other cetacean species recorded during vessel surveys in the survey area and in transit during 2004.

Date	Vessel Position						Ship course	Time		Number and Position of Animals				Comments
	Latitude N			Longitude E						No.	Цифер-блат		m	
	°	'	"	°	'	"		hr	min		От-куда	Ку-да		
GRAY WHALE														
Aug 6	52	52	608	143	23	784	335	12	0	1	9	9	2500	
	52	52	608	143	23	784	335	12	0	1	9	9	3500	
	52	52	608	143	23	784	335	12	0	1	7	7	3000	
	52	54	801	143	22	650	328	13	0	1	9	9	2000	
	52	52	88	143	20	89	255	15	30	3	10	9	4000	
	52	52	88	143	20	89	255	15	30	1	8	9	4000	
	52	52	88	143	20	84	255	15	30	1	8	9	3500	
	52	47	382	143	25	736	164	17	20	3	9	9	5000	whales were lone individuals; playing.
	52	43	737	143	22	893	212	17	52	2	3	3	3000	
	52	50	3	143	27	59	2	19	0	4	11	11	10000	
	52	58	417	143	24	811	314	20	0	1	9	9	4000	
Aug 7	53	16	1	143	17	79	343	6	0	3	8	9	800	
	53	16	806	143	17	318	343	6	10	1	10	9	1000	
	53	16	806	143	17	318	343	6	10	2	9	9	900	
	53	16	806	143	17	318	343	6	10	3	10	9	600	
	53	17	750	143	16	820	342	6	16	2	2	3	700	
	53	17	750	143	16	820	342	6	16	2	2	3	400	
	53	18	890	143	16	174	340	6	22	1	11	9	1000	
	53	22	157	143	13	964	340	6	40	1	8	9	1500	
	53	28	91	143	9	270	340	7	20	1	2	3	1500	
	53	29	950	143	9	299	160	7	30	1	9	9	2000	
	53	29	950	143	4	299	160	7	30	1	9	9	1500	
	53	22	66	143	13	66	164	8	0	1	12	3	900	
	53	19	56	143	15	43	174	8	10	2	12	3	100	
	53	19	56	143	15	43	174	8	10	1	1	3	800	
	53	16	44	143	16	20	175	8	12	3	11	3	1000	
	53	16	44	143	16	20	175	8	12	4	12	3	1000	
	53	15	89	143	16	32	175	8	44	1	2	3	700	
	53	15	36	143	16	44	175	8	45	1	1	3	800	
	53	13	58	143	16	88	175	8	50	1	2	3	900	
	53	12	89	143	17	4	175	8	50	1	2	3	700	
	53	12	89	143	17	4	175	8	53	1	10	9	1500	
	53	12	89	143	17	4	175	8	53	1	10	9	1000	
	53	12	32	143	17	16	175	9	0	1	10	9	900	
	53	12	32	143	17	16	175	9	0	3	2	3	800	
	53	8	14	143	18	29	174	9	22	1	1	3	500	
	53	5	20	143	19	4	174	11	28	1	9	9	3500	
	52	57	1	143	21	14	90	12	13	3	12	3	3500	
	52	54	21	143	24	27	180	12	35	1	2	3	600	
	52	53	0	143	24	41	179	12	40	1	1	3	2500	
	52	52	97	143	24	51	178	12	45	1	1	3	3500	
	52	48	76	143	23	4	210	13	0	1	2	3	3000	
	52	48	1	143	22	49	210	13	6	1	2	3	2000	
	52	40	0	143	21	78	184	13	46	1	1	3	400	

Aug 16	52	50	12	143	29	97	160	12	10	2	3	3	10000	
	52	50	12	143	29	97	160	12	10	1	3	3	10000	
Aug 17	52	49	22	143	24	82	156	8	28	2	2	2	5000	
	52	49	22	143	24	84	204	9	16	2	3	3	5000	
	52	45	58	143	22	8	2	12	54	1	1	3	600	
	52	49	45	143	22	39	359	13	20	1	10	9	1500	
	52	50	37	143	22	36	352	13	28	2	9	9	1000	
	52	51	69	143	22	14	352	13	40	3	11	9	1000	one calf
	52	52	30	143	22	8	24	13	44	1	2	3	600	
	52	52	30	143	22	8	24	13	44	1	2	3	500	
	52	55	94	143	21	95	318	14	54	1	11	9	1500	surfaced 3 times in 7 min. and twice in 4 min. without spouting
	52	56	68	143	21	51	360	15	0	1	9	9	1000	
	53	0	67	143	19	88	360	15	21	1	11	9	1000	
	53	0	67	143	19	88	360	15	21	1	1	3	500	
	53	0	67	143	19	88	360	15	21	1	2	3	300	
	53	0	67	143	19	88	360	15	21	1	10	9	800	
	53	2	88	143	19	42	360	16	33	1	1	3	500	
	53	3	83	143	19	24	360	16	38	2	2	3	500	
	53	8	29	143	18	11	360	16	5	1	2	3	300	
	53	9	22	143	17	93	360	16	8	1	12	3	400	
	53	10	66	143	17	61	360	16	17	1	1	3	600	emerged twice without spouting
	53	11	9	143	17	52	360	16	20	1	11	9	300	
	53	11	84	143	17	36	360	16	24	1	1	3	500	
	53	11	84	143	17	36	360	16	24	1	10	9	600	
	53	12	44	143	17	22	360	16	28	2	2	3	3500	
	53	12	44	143	17	22	360	16	28	1	1	3	5000	
	53	12	65	143	17	18	360	16	30	1	2	3	800	
	53	14	22	143	16	80	360	16	39	1	1	3	400	
	53	15	91	143	16	9	360	16	50	2	1	3	5000	
	53	15	91	143	16	9	360	16	50	1	10	9	1000	
	53	17	20	143	15	55	360	17	0	1	10	9	2500	
	53	17	77	143	15	32	360	17	1	3	1	3	2500	
	53	18	7	143	15	19	360	17	3	1	11	9	300	
	53	18	45	143	15	1	360	17	3	2	1	3	1500	
	53	18	45	143	15	1	360	17	3	2	10	9	2000	
	53	19	15	143	14	64	360	17	10	1	10	9	500	
	53	19	15	143	14	64	360	17	10	1	10	9	500	
	53	19	15	143	14	64	360	17	10	1	10	9	700	
	53	19	15	143	14	64	360	17	10	1	10	9	2000	
	53	21	24	143	13	57	360	17	23	1	10	9	2000	
	53	21	24	143	13	57	360	17	23	1	1	3	2000	
	53	21	24	143	13	57	360	17	23	2	1	3	2500	
	53	23	25	143	12	19	360	17	41	1	2	3	2000	
	53	24	60	143	11	85	360	17	45	2	1	3	2000	
	53	25	4	143	11	62	360	17	48	1	1	3	1000	
	53	25	78	143	11	24	360	17	54	1	2	3	800	
	53	25	78	143	11	24	360	17	54	1	2	3	1000	
	53	26	75	143	10	73	360	18	0	1	1	3	600	
	53	27	56	143	10	30	360	18	4	1	1	3	300	
	53	29	12	143	9	62	360	18	14	2	1	3	2000	
	53	34	46	143	8	87	270	18	46	2	10	9	200	playing
	53	28	23	143	13	6	156	19	14	2	3	3	1500	
	53	28	23	143	13	6	156	19	14	1	3	3	2000	
	53	24	70	143	25	9	156	19	38	1	3	3	2500	
	53	21	35	143	17	4	156	19	52	4	3	3	6000	
	53	21	35	143	17	4	156	20	52	1	3	4	6000	
	53	18	70	143	18	50	156	20	10	3	3	3	6000	

	53	18	70	143	18	50	156	20	10	1	3	4	6000	
	53	14	83	143	20	4	156	20	28	1	3	3	6000	
	53	13	80	143	20	40	153	20	32	3	11	9	300	
	53	13	35	143	20	52	153	20	36	1	3	3	6000	
	53	13	35	143	20	52	153	20	36	1	11	9	200	
	53	13	35	143	20	52	153	20	36	2	3	4	6000	
	53	12	23	143	20	52	153	20	40	1	3	3	6000	
	53	11	14	143	21	25	153	20	45	1	3	3	6000	
	53	9	3	143	21	48	153	20	55	2	3	3	6000	
Aug 19	52	50	48	143	23	26	162	8	50	1	2	3	2000	
	52	50	48	143	23	26	162	8	50	1(1)	1	3	2000	frequent floating of fog with visibility of 0.05-0.5 km; in parentheses - calf
	52	51	30	143	23	68	8	9	0	1	11	9	3000	
	52	54	17	143	24	7	304	9	25	1	11	9	3500	
Aug 20	52	49	77	143	25	56	23	17	42	2	3	3	5500	
	52	49	85	143	26	14	164	17	53	1	4	4	6000	
	52	50	50	143	24	92	237	19	0	2	2	2	4000	
	52	50	75	143	24	68	199	19	15	2	2	2	5000	
Aug 21	52	46	40	143	26	22	2	18	24	1	9	9	5000	
	52	50	13	143	26	83	0	18	42	2	8	9	6000	
	52	50	13	143	26	83	0	18	42	1	9	9	6000	
	52	53	68	143	27	1	326	18	0	1	9	9	5000	
	52	55	56	143	25	41	323	19	7	1	9	9	7000	
	52	55	56	143	25	41	323	19	7	1	9	9	1500	
	52	56	96	143	24	7	324	19	15	2	9	9	5000	
	52	57	84	143	23	20	324	19	20	3	9	9	4000	
	52	58	86	143	22	22	326	19	25	2	9	9	4000	
	52	58	86	143	22	22	326	19	25	1	8	9	4000	
	52	59	66	143	21	52	321	19	30	1	9	9	3500	
	53	0	4	143	21	55	104	19	35	2	8	8	6000	
	53	0	4	143	21	55	104	19	35	2	8	8	5500	gray whales moved south after 7:00 p.m.
	53	0	43	143	21	30	42	20	0	1	10	10	6000	moving north
Aug 26	52	52	34	143	22	66	260	14	0	1	8	9	1500	
	52	52	34	143	22	66	260	14	0	1	2	3	1500	
	52	52	34	143	22	66	260	14	0	1	1	3	400	
	52	52	35	143	22	60	346	14	22	1	8	9	1000	
	53	3	82	143	20	9	324	16	0	2	10	9	2000	
	53	3	82	143	20	9	324	16	0	2	10	9	2500	
	53	3	82	143	20	9	324	16	0	1(1)	9	9	2000	
	53	4	7	143	19	84	357	16	36	1	3	3	150	
	53	4	32	143	19	87	358	16	40	1	10	9	500	
	53	12	21	143	18	6	282	19	18	2	1	3	500	
Aug 27	53	9	15	143	19	62	173	7	37	1	10	9	300	
	53	7	37	143	19	88	173	7	47	1	10	9	100	
	53	6	19	143	19	93	177	8	0	2	3	3	3000	Almost all whales moving slowly north producing small spouts no larger than 0.5 m
	53	6	19	143	19	93	177	8	0	2	4	3	2500	
	53	4	51	143	20	18	260	9	0	1	1	3	400	
	52	54	34	143	23	39	133	15	0	1	10	10	600	
Aug 28	52	41	83	143	24	53	211	14	0	1	3	3	5000	
Aug 29	52	57	83	143	21	93	185	9	0	1	1	3	1000	
	52	53	3	143	22	80	172	11	12	4	2	3	2000	
	52	51	85	143	24	69	181	12	0	1	3	3	6000	
	52	49	84	143	24	55	177	12	20	1	3	3	2000	
Aug 30	52	53	52	143	23	47	190	7	0	2	12	1	700	
	52	53	52	143	23	47	190	7	0	1	2	2	2000	
	52	54	66	143	27	13	95	8	50	1	6	6	7000	

	52	54	66	143	27	13	95	8	50	1	6	6	7000	
	52	54	66	143	27	13	95	8	50	1	6	6	7000	
	52	58	4	143	22	70	2	12	0	1	9	9	3500	
	53	0	39	143	22	68	355	12	0	1	9	9	3000	
	53	0	39	143	22	68	355	12	7	1	9	9	4000	
	53	3	13	143	22	94	355	12	18	1	9	9	3000	
	53	4	82	143	22	91	355	12	26	1	9	9	3000	
	53	6	9	143	22	79	332	12	35	2	9	9	4000	
	53	6	9	143	22	79	332	12	35	1	1	3	400	
	53	6	31	143	22	63	270	12	38	1	12	12	600	
	53	6	31	143	22	63	270	12	38	1	9	9	500	
	53	2	50	143	23	30	180	13	42	2	1	3	300	
	53	2	50	143	23	30	180	13	42	1	1	3	200	
	53	2	50	143	23	30	180	13	42	3	3	3	5500	playing while moving north
	52	59	97	143	23	29	179	14	6	1	1	3	700	moving north
Aug 31	53	6	51	143	20	1	344	12	50	1	1	3	100	
Sep 4	53	27	73	143	9	98	158	8	36	1	3	3	1500	
	53	26	52	143	10	74	158	8	45	1	9	9	1500	
	53	25	42	143	11	85	84	9	0	1	1	2	3500	
	53	25	85	143	14	23	43	9	24	2	1	1	1000	moving north, playing
	53	21	57	143	16	5	168	11	0	2	3	3	200	
	53	17	6	143	17	25	171	11	23	1	3	3	2000	
	53	16	49	143	17	38	171	11	26	1	3	3	2000	
	53	16	49	143	17	38	171	11	26	1	9	9	1500	
	53	15	84	143	17	52	172	11	32	2	3	3	1500	
	53	15	84	143	17	52	172	11	32	1	9	9	300	
	53	14	97	143	17	73	172	11	38	2	3	3	1500	
	53	14	35	143	17	87	173	11	42	2	3	3	1500	
	53	13	40	143	18	4	173	11	48	1	3	3	2000	
	53	11	39	143	18	40	173	12	0	2	3	3	1500	
	53	10	73	143	18	57	174	12	10	1	3	3	1500	
	53	10	73	143	18	57	174	12	10	1	3	3	1000	
	53	10	73	143	18	57	174	12	10	2	3	3	1300	
	53	10	73	143	18	57	174	12	10	1	3	3	1600	all whales were alone at 10-11 a.m.; by 12 o'clock, they started toward shore 2 by 2
	53	5	38	143	19	88	170	12	42	2	3	3	2000	
	53	5	38	143	19	88	171	12	42	1	3	3	200	
	53	4	10	143	20	20	168	12	46	1	3	3	1500	
	53	0	50	143	21	6	170	13	0	1	3	3	500	
	52	59	29	143	21	20	174	13	14	4	3	3	1500	
	52	59	29	143	21	20	174	13	14	1	9	9	300	
	52	58	17	143	21	40	171	13	21	3	9	9	1000	
	52	56	97	143	21	61	174	13	28	1	3	3	1500	
	52	56	97	143	21	61	174	13	28	1	9	9	600	
	52	56	42	143	21	67	175	13	31	3	3	3	600	all whales moving north
	52	55	83	143	21	74	178	13	40	1	3	3	400	
	52	55	83	143	21	74	178	13	40	1	3	3	600	
	52	55	83	143	21	74	178	13	40	1	9	3	300	
	52	54	19	143	22	72	185	14	54	1	3	3	3000	
	52	52	29	143	23	25	163	15	5	1	3	3	3000	
	52	51	29	143	23	70	163	15	9	1	3	3	3000	
Sep 5	52	55	57	143	21	76	245	6	53	1	3	3	2000	
	52	55	57	143	21	76	245	6	53	1	3	3	3000	
	52	55	57	143	21	76	245	6	53	1	3	3	3000	
	52	53	16	143	25	67	227	11	33	1	1	2	200	
	52	51	87	143	24	38	233	11	49	1	12	12	2500	
	52	53	19	143	24	18	348	12	26	2	9	9	3000	

	52	55	55	143	23	41	348	12	40	1	9	9	2500	
	52	59	67	143	22	17	348	13	4	2	9	9	2500	
	53	0	86	143	21	81	340	13	4	2	3	3	500	
	53	0	86	143	21	81	340	13	4	3	9	9	600	
	53	0	69	143	22	3	234	13	30	2	12	1	3600	
	53	0	69	143	22	3	234	13	30	1	12	1	3600	started playing at 2:00 p.m.
	53	1	35	143	22	33	248	15	0	1	9	9	1000	
	53	2	72	143	21	99	351	15	16	1	9	9	1200	
	53	4	63	143	21	32	346	15	26	1	9	9	3000	
	53	5	41	143	21	1	345	15	30	1	9	9	3000	
	53	6	70	143	20	48	345	15	38	1	9	9	2500	
	53	8	26	143	19	83	345	15	48	1	9	9	3000	
	53	8	26	143	19	83	345	15	48	1	9	9	2500	
	53	9	49	143	19	29	345	15	55	4	3	3	2000	
	53	10	12	143	19	3	345	16	0	1	9	9	3000	
	53	12	55	143	18	20	345	16	13	1	9	9	3000	
	53	13	61	143	18	39	293	16	40	1	3	3	2000	
	53	14	28	143	19	19	31	17	0	1	9	9	3000	
	53	14	19	143	19	46	24	17	5	2	1	1	4000	
	53	14	19	143	19	46	24	17	5	1	11	11	3600	
	53	14	19	143	19	46	24	17	5	1	11	11	3500	
	53	14	19	143	19	46	24	17	5	1	11	11	3800	
	53	14	19	143	19	46	24	17	5	1	10	10	5000	
	53	14	40	143	19	50	318	17	11	1	11	11	1500	
	53	15	9	143	19	12	340	17	32	2	9	9	2000	
	53	16	29	143	17	84	313	18	7	2	3	3	800	
	53	16	90	143	16	63	316	18	13	1	3	3	200	
	53	16	90	143	16	68	316	18	13	2	9	9	1000	
	53	16	90	143	16	68	316	18	13	2	9	9	1200	
	53	17	52	143	15	88	311	18	17	2	3	3	700	
	53	18	1	143	15	50	311	18	20	2	9	9	3000	
	53	18	1	143	15	50	311	18	20	4	9	9	600	
	53	18	1	143	15	50	311	18	20	1	3	3	200	
	53	18	1	143	15	50	311	18	20	2	3	3	300	
	53	18	1	143	15	50	311	18	20	2	3	3	400	
	53	19	49	143	15	30	346	19	0	2	9	9	800	
	53	19	49	143	15	30	346	19	0	1	3	3	2000	
	53	19	49	143	15	30	346	19	0	2	3	3	600	
Sep 6	52	50	13	143	23	22	199	7	0	1	12	9	1000	
	52	50	13	143	23	21	204	8	0	1	1	3	1000	
	52	49	31	143	24	86	90	9	16	2	3	5	2500	
	52	52	88	143	22	27	330	12	2	1	12	9	400	
	52	50	14	143	22	0	163	13	0	2	3	3	500	
	52	47	78	143	23	88	168	13	11	2	3	3	600	
	52	22	25	143	42	14	151	15	30	2	3	3	300	
	52	19	96	143	43	98	59	16	0	2	8	8	800	
	52	17	55	143	42	87	163	18	35	1	9	9	500	
Sep 8	52	48	84	143	24	25	298	11	28	1	12	12	3000	
	52	58	48	143	21	60	342	13	40	2	9	9	2000	
	52	59	29	143	21	35	351	13	54	2	9	11	2000	
	52	59	76	143	21	20	32	13	58	1	9	9	1500	
	52	59	76	143	21	20	32	13	58	1	9	9	2000	
	52	59	75	143	21	52	151	14	0	2	1	9	2000	
	52	59	75	143	21	52	151	14	0	2	8	9	2000	
	52	59	97	143	20	24	348	14	44	1	11	10	100	
	53	2	36	143	20	53	353	15	0	1	9	9	2000	
	53	4	24	143	20	7	353	15	11	1	9	9	300	
	53	4	24	143	20	7	353	15	11	1	9	9	1500	

	53	4	24	143	20	7	353	15	11	1	9	9	800	
	53	4	24	143	20	7	353	15	11	1	9	9	3000	
	53	5	40	143	19	80	353	15	16	1	9	9	1500	
	53	5	40	143	19	80	353	15	16	1	9	9	100	
	53	5	40	143	19	80	353	15	16	1	9	9	1400	
	53	8	20	143	19	17	354	15	34	3	9	9	1500	
	53	9	24	143	18	97	353	15	38	1	9	9	2000	
	53	9	24	143	18	97	353	15	38	1	9	9	1700	
	53	9	24	143	18	97	353	15	38	1	9	9	1500	
	53	10	86	143	18	61	353	15	43	1	11	9	700	
	53	11	65	143	18	44	353	15	52	1	10	9	1000	
	53	13	51	143	18	63	24	16	3	1	8	9	3000	
	53	13	81	143	18	82	23	16	5	1	2	3	500	
	53	14	4	143	19	7	23	16	7	2	2	3	300	
	53	14	4	143	19	7	23	16	7	1	9	9	3500	
	53	14	82	143	17	40	300	16	15	1	9	9	2000	
	53	15	7	143	16	67	327	16	18	1	10	9	250	
	53	15	7	143	16	67	327	16	18	2	8	9	500	
	53	15	88	143	16	17	350	16	20	1	11	9	500	
	53	16	45	143	16	0	350	16	25	1	10	9	800	
	53	16	45	143	16	0	350	16	25	1	11	9	300	
	53	16	45	143	16	0	350	16	25	1	8	9	700	
	53	17	2	143	15	83	350	16	28	1	10	9	800	
	53	17	2	143	15	83	350	16	28	2	11	9	400	
	53	17	2	143	15	83	350	16	28	1	8	9	700	
	53	17	46	143	15	70	350	16	31	1	9	9	350	
	53	17	46	143	15	70	350	16	31	2	9	9	600	
	53	17	46	143	15	70	350	16	31	1	11	9	700	
	53	17	46	143	15	70	350	16	31	1	9	9	1500	
	53	18	1	143	15	53	350	16	34	2	9	9	600	
	53	18	1	143	15	53	350	16	34	1	11	9	800	
	53	18	1	143	15	53	350	16	34	1	1	3	600	
	53	18	62	143	15	35	350	16	38	2	9	9	300	
	53	18	62	143	15	35	350	16	38	1	9	9	500	
	53	20	6	143	14	91	351	16	46	1	11	9	400	
	53	20	6	143	14	91	351	16	46	1	10	9	700	
	53	20	6	143	14	91	351	16	46	1	11	9	300	fog from sea; visibility toward shore 3 miles
	53	22	62	143	14	16	351	16	46	1	11	9	500	
	53	23	94	143	13	76	350	17	8	1	12	9	400	
Sep 10	53	33	4	143	7	19	186	6	50	2	9	9	100	swells 1.5-2 m
	53	23	84	143	12	84	164	8	0	1	2	2	2000	
	53	21	45	143	13	98	159	9	44	1	3	3	2000	
	53	19	74	143	15	69	130	9	0	1	3	3	300	
	53	19	34	143	16	90	155	9	14	2	3	3	200	
	53	19	38	143	16	94	132	9	20	1	2	3	1000	
	53	19	53	143	17	6	118	9	36	2	2	3	1500	
	53	19	37	143	17	89	124	9	43	1	2	3	500	
	53	19	37	143	17	89	124	9	43	1	1	3	800	
	53	18	23	143	17	88	224	10	19	1	1	3	800	
	53	17	80	143	16	98	142	10	34	1	1	3	2000	
	53	17	80	143	16	98	142	10	34	1	1	3	2500	
	53	16	72	143	18	26	168	11	0	1	3	3	1000	
	53	16	72	143	18	26	168	11	0	1	3	3	800	
	53	16	72	143	18	26	168	11	0	2	1	1	300	
	53	16	24	143	18	43	184	11	3	4	1	1	400	
	53	15	77	143	18	40	126	11	11	2	2	2	300	
	53	15	80	143	18	46	126	11	25	1	3	3	1000	

	53	15	80	143	18	46	126	11	25	1	3	3	1500	
	53	15	80	143	18	46	126	11	25	1	3	3	1200	
	53	14	20	143	18	78	142	13	221	1	3	3	500	
	53	13	75	143	19	29	143	13	24	1	3	3	3700	
	53	12	43	143	20	69	141	13	43	2	1	3	1000	
	53	12	43	143	20	69	141	13	43	1	2	3	5000	
	53	12	43	143	20	69	141	13	43	1	3	3	4500	
	53	12	43	143	20	69	141	13	43	1	3	3	4700	
	53	11	80	143	22	32	106	13	55	3	9	9	100	
	53	11	13	143	18	17	284	16	32	1	1	3	400	
	53	11	3	143	18	6	251	16	43	1	12	11	300	
	53	10	71	143	18	7	264	16	54	1	11	11	2000	
	53	8	18	143	18	62	171	17	26	1	3	3	2000	
	53	8	18	143	18	62	171	17	26	1	9	9	1000	
	53	6	63	143	19	6	169	17	41	2	3	3	400	
	53	6	54	143	19	7	167	17	43	1	3	3	600	
	53	6	54	143	19	7	167	17	43	1	3	3	500	
	53	6	35	143	19	17	139	17	46	1	1	1	400	
	53	6	35	143	19	17	139	17	46	1	11	11	400	
Sep 11	52	53	48	143	23	83	134	8	0	3	12	12	600	
	52	54	53	143	25	84	9	9	11	2	9	9	6000	
	52	55	26	143	26	8	304	9	34	1	9	9	6500	
	52	55	26	143	26	8	304	9	34	1	9	9	6000	
	53	0	23	143	20	89	351	10	30	2	3	3	500	
	53	3	84	143	20	6	352	10	44	1	3	3	500	
	53	5	92	143	19	65	352	10	54	1	10	9	400	
	53	7	75	143	19	30	352	11	0	1	9	9	600	
	53	16	32	143	16	39	346	11	48	3	3	3	800	
	53	16	32	143	16	39	346	11	48	2	3	3	1200	
	53	16	32	143	16	39	346	11	48	1	9	9	300	
	53	24	45	143	13	36	342	12	33	4	2	3	600	
	53	24	31	143	13	43	284	12	46	2	3	4	1000	
	53	24	31	143	13	43	284	12	46	2	2	2	3000	
	53	24	46	143	13	27	348	13	0	1	10	9	3000	
	53	25	65	143	13	14	357	13	10	2	2	2	200	
	53	25	65	143	13	14	357	13	10	2	2	2	2000	
	53	25	65	143	13	14	357	13	10	2	3	3	300	
	53	25	66	143	14	7	264	14	0					
	53	28	49	143	12	96	63	14	35	3	1	1	300	
	53	28	49	143	12	96	63	14	35	1	9	9	400	
	53	27	95	143	13	18	238	15	0					
	53	25	76	143	14	96	195	16	0	2	9	9	500	repetition started at 4:00 p.m.
	53	25	76	143	14	96	195	16	0	2	3	3	700	
	53	25	76	143	14	96	195	16	0	3	2	2	500	
	53	25	76	143	14	96	195	16	0	1	11	12	600	all 8 whales were playing
	53	23	56	143	15	42	169	16	23	1	3	3	2000	
	53	20	86	143	16	270	168	16	35	4	3	3	2000	one at a time, but at the same (uniform) distance from shore
	53	18	38	143	17	8	169	16	50	2	3	3	300	
	53	16	44	143	17	69	168	17	0	5	3	3	3000	
	53	14	73	143	18	23	168	17	7	5	9	9	300	one by one at the same level every 100-200 m
	53	14	73	143	18	23	168	17	7	1	3	3	3000	
	53	14	73	143	18	23	168	17	7	3	3	3	200	
	53	8	47	143	20	7	168	17	35	2	3	3	3000	
	53	8	47	143	20	7	168	17	35	1	3	3	4000	
	53	4	49	143	21	49	163	18	0	1	3	3	3000	
	53	0	63	143	22	95	168	18	15	1	3	3	3000	
	52	56	42	143	23	74	172	18	35	1	1	1	4000	

	52	56	42	143	23	74	172	18	35	1	3	3	4000	
	52	53	30	143	24	27	173	19	0	1	3	3	3000	
	52	53	30	143	24	27	173	19	0	2	2	2	3000	
	52	51	58	143	24	56	172	19	5	1	3	3	2000	
	52	51	58	143	24	56	172	19	5	2	3	3	4000	
	52	48	83	143	24	984	173	19	18	1	3	3	4000	
	52	47	40	143	25	18	173	19	26	1	3	3	2000	
	52	46	80	143	25	27	172	19	30	1	3	3	4000	incomplete repeated count from 4:00 to 7:00 p.m.
Sep 12	53	6	4	143	18	1	347	6	40	1(1)	11	8	400	
	53	8	7	143	17	5	348	6	43	1	9	9	300	
	53	14	89	143	16	33	349	7	25	1(1)	3	3	200	
	53	14	89	143	16	33	349	7	25	1	3	3	300	
	53	14	89	143	16	33	349	7	25	1	3	3	400	
	53	23	52	143	13	42	348	8	7	1	9	9	500	
	53	23	52	143	13	42	348	8	7	1	3	3	150	
	53	25	90	143	12	83	348	8	20	1	3	3	400	
	53	25	90	143	12	23	348	8	20	2	3	3	800	
	53	26	66	143	12	40	348	8	23	2	3	3	700	
	53	27	64	143	12	8	348	8	30	1	3	3	800	
	53	28	36	143	11	82	346	8	31	1	3	3	900	
	53	29	0	143	11	61	346	8	34	2	3	3	800	
	53	29	0	143	11	61	346	8	34	1	3	3	300	
	53	30	3	143	11	13	346	8	40	1	10	9	300	
	53	29	72	143	11	53	165	9	50	1	12	12	300	
	53	29	930	143	12	101	165	10	6	2	9	9	300	
	53	29	93	143	12	101	165	10	0	1	3	3	6000	
	53	28	9	143	12	90	213	10	46	1	3	3	300	rain, fog
	53	25	29	143	11	46	158	14	38	2	3	3	200	
	53	21	83	143	13	53	145	15	20	1	3	3	300	
	53	21	83	143	13	53	145	15	20	1	10	9	200	
	53	21	83	143	13	53	145	15	20	1	3	3	200	
	53	14	50	143	16	54	170	16	0	1	3	3	700	
	53	13	62	143	16	76	170	16	2	1	3	3	400	
	53	12	89	143	16	97	170	16	6	2	3	9	200	
	53	12	89	143	16	97	170	16	6	1	3	3	300	
	53	12	89	143	16	97	170	16	6	1	9	9	800	
	53	12	89	143	16	97	170	16	6	1	9	9	500	
	53	11	84	143	17	23	172	16	11	2	10	9	300	
	53	11	6	143	17	39	172	16	15	1	3	3	600	
	53	9	82	143	17	64	172	16	20	1	2	3	500	
	53	8	96	143	17	79	172	16	26	1	10	9	400	
	53	8	13	143	17	97	172	16	31	1	10	9	400	
	53	4	93	143	18	63	172	16	45	1	2	3	200	
Sep 13	53	10	2	143	18	13	352	8	44	1	10	9	600	
	53	11	52	143	17	75	349	8	51	1	9	9	2200	
	53	13	11	143	17	30	342	9	0	1	2	2	4000	
	53	13	11	143	17	30	342	9	0	1	3	3	700	
	53	13	85	143	16	98	340	9	5	1	3	3	200	
	53	13	85	143	16	98	340	9	5	2	1	2	2000	
	53	13	95	143	16	99	351	9	7	2	10	10	1000	
	53	13	95	143	17	2	33	9	12	1	1	2	1000	
	53	14	15	143	17	75	68	9	16	2	10	9	300	
	53	16	42	143	16	81	78	12	0	3	10	9	400	swells 1.5-2 m, whales were playing
	53	16	41	143	17	10	356	12	20	1	3	9	1500	
	53	17	6	143	16	88	336	12	28	1	3	3	1500	
	53	17	6	143	16	88	336	12	28	1	9	9	3000	
	53	17	6	143	16	88	336	12	28	1	9	9	2500	

	53	18	53	143	15	95	335	12	46	1	9	9	2000	
	53	18	53	143	15	95	325	12	46	1	10	9	2500	
	53	19	17	143	15	52	337	12	50	1	9	9	3500	
	53	19	17	143	15	52	337	12	50	1	10	9	800	
	53	19	80	143	15	12	340	12	52	1	2	3	3000	
	53	21	13	143	14	31	338	13	0	1	10	9	2500	
	53	21	13	143	14	31	338	13	0	1	3	3	2500	
	53	22	50	143	13	47	338	13	11	3	2	3	800	
	53	22	50	143	13	47	338	13	11	1	9	9	800	
	53	23	6	143	13	13	338	13	14	2	9	9	800	
	53	23	6	143	13	13	338	13	14	1	3	3	1500	
	53	23	6	143	13	13	338	13	14	1	3	3	1000	
	53	23	75	143	12	70	338	13	17	2	2	3	2000	
	53	23	75	143	12	70	338	13	17	1	2	3	300	
	53	23	75	143	12	70	338	13	17	1	3	3	1500	
	53	24	35	143	12	33	338	13	24	1	2	3	800	
	53	24	35	143	12	33	338	13	24	1	3	3	700	
	53	24	35	143	12	33	338	13	24	3	3	3	1200	
	53	24	92	143	11	97	338	13	26	1	3	3	300	
	53	24	92	143	11	97	338	13	26	1	2	3	2000	
	53	24	92	143	11	97	338	13	26	2	3	3	800	
	53	26	5	143	11	79	2	13	35	1	3	3	300	
	53	23	60	143	13	17	168	17	15	1	3	3	2500	whales feeding individually and in pairs joined into a group of 5 at 2:20 p.m. and played, jumping 6 times
	53	23	60	143	13	17	168	17	15	2	2	3	2500	
	53	23	60	143	13	17	168	17	15	1	9	9	3000	
	53	22	28	143	13	65	168	17	22	1	9	9	800	
	53	22	28	143	13	65	168	17	22	1	8	9	300	
	53	22	28	143	13	65	168	17	22	1	3	3	2000	
	53	21	23	143	14	1	169	17	27	1	9	9	2000	
	53	21	23	143	14	1	169	17	27	2	3	3	400	
	53	20	48	143	14	25	169	17	31	2	3	3	2000	
	53	20	1	143	14	41	169	17	33	3	3	4	400	
	53	20	1	143	14	41	169	17	33	1	3	3	400	
	53	18	50	143	14	91	169	17	40	1	3	3	600	
	53	18	50	143	14	91	169	17	40	3	3	3	400	
	53	17	87	143	15	11	169	17	45	1	3	3	400	
	53	15	32	143	15	92	169	18	0	1	9	9	600	
	53	15	32	143	15	92	169	18	0	1	3	3	900	
	53	15	32	143	15	92	169	18	0	1	2	3	500	
	53	15	32	143	15	92	169	18	0	1	3	3	300	
	53	15	32	143	15	92	169	18	0	1	9	9	400	
	53	13	88	143	16	37	169	18	5	2	1	4	600	
	53	13	88	143	16	37	169	18	5	3	2	3	2000	
	53	13	88	143	16	37	169	18	5	2	3	3	800	practically all whales moving north. Whales playing in group of 3
	53	6	90	143	18	89	164	18	41	1	2	4	800	whale was moving north, making 3 spouts for 50-60 sec. every 5-7 min. under water
	53	3	87	143	20	8	166	19	0	1	1	5	3000	moving north
	52	59	50	143	21	47	168	19	18	1	1	5	2500	moving north, longest interval between spouts 4:03 – 4:22
	52	55	9	143	22	95	160	19	39	2	1	3	3600	
	52	54	9	143	22	43	164	19	45	1	3	3	4000	
	52	54	9	143	22	43	164	19	45	1	3	5	4000	all whales moving north
Sep 14	53	1	16	143	25	32	312	8	36	1	9	9	7000	
	53	2	93	143	22	59	303	8	48	1	11	9	2500	
	53	8	77	143	18	70	343	10	19	2	1	2	500	
	53	8	82	143	18	71	268	10	27	2	3	1	500	

	53	7	99	143	18	44	178	10	35	1	12	11	500	
	53	11	82	143	17	55	353	11	29	1	3	3	300	
	53	12	14	143	17	48	353	11	31	1	3	3	300	
	53	12	88	143	17	40	2	11	34	2	1	2	400	
	53	12	91	143	17	46	287	11	48	1	3	3	900	
	53	11	54	143	18	73	338	14	0	2	9	9	500	
	53	13	4	143	17	71	330	14	31	1	9	9	2000	
	53	13	46	143	17	35	13	14	40	1	10	9	2000	
	53	13	34	143	17	33	326	14	49	1	10	9	2000	
	53	13	60	143	17	10	337	15	0	1	10	9	2000	
	53	14	37	143	16	64	344	15	3	2	9	9	150	
	53	14	37	143	16	64	344	15	3	2	9	9	400	
	53	14	37	143	16	64	344	15	3	1	9	9	2000	
	53	15	63	143	15	92	339	15	13	1	10	9	500	all whales moving southward
	53	15	82	143	15	80	339	15	17	4	9	9	1000	
	53	15	82	143	15	80	334	15	17	1	9	9	2000	
	53	16	26	143	15	58	350	15	45	1	12	8	400	
	53	17	32	143	15	40	354	16	0	1	1	3	500	
	53	17	80	143	17	81	2	16	4	2	10	9	800	
	53	17	80	143	17	81	2	16	4	2	9	9	300	
	53	17	80	143	17	81	2	16	4	2	9	9	400	
	53	19	8	143	14	86	350	16	27	1	3	3	700	
	53	19	8	143	14	86	350	16	27	1	9	9	500	
	53	21	67	143	14	17	344	16	44	2	3	3	1000	
	53	21	89	143	14	10	342	16	48	2	1	3	2000	
	53	21	89	143	14	10	342	16	48	1	2	3	1500	
	53	21	89	143	14	10	342	16	48	1	11	10	2000	
	53	19	37	143	14	89	164	17	21	1	9	9	300	
	53	19	0	143	15	8	143	17	23	1	3	3	800	
	53	18	61	143	15	10	168	17	35	1	3	3	500	
	53	18	61	143	15	10	168	17	35	1	9	9	1000	
	53	18	61	143	15	10	168	17	35	1	9	9	2000	
	53	18	14	143	15	31	163	17	37	1	3	3	400	
	53	17	82	143	15	46	163	17	40	1	9	9	600	
	53	17	82	143	15	46	163	17	40	2	3	3	300	
	53	17	27	143	15	71	164	17	43	1	3	3	400	
	53	17	27	143	15	71	164	17	43	1	3	3	700	
	53	17	27	143	15	71	164	17	43	1	3	3	500	
	53	16	75	143	15	91	167	17	45	1	3	3	500	
	53	16	75	143	15	91	167	17	45	1	3	3	700	
	53	16	75	143	15	91	167	17	45	1	3	3	600	
	53	16	75	143	15	91	167	17	45	1	9	9	500	
	53	16	32	143	16	5	168	17	47	3	9	9	400	
	53	15	84	143	16	21	168	17	50	3	9	9	400	
	53	15	31	143	16	38	168	17	52	1	3	3	500	
	53	15	31	143	16	38	168	17	52	1	9	9	500	
	53	14	50	143	16	66	168	17	56	2	3	3	300	
	53	14	50	143	16	66	168	17	56	1	3	3	400	
	53	13	86	143	16	87	167	17	59	1	3	3	200	
	53	12	72	143	17	25	169	18	4	1	3	3	500	
	53	12	72	143	17	25	168	18	4	2	3	3	700	
	53	12	13	143	17	44	168	18	7	2	3	3	600	
	53	11	74	143	17	57	168	18	10	1	3	3	200	
	53	9	79	143	18	18	168	18	20	1	3	3	300	
	53	9	79	143	18	18	168	18	20	1	3	3	300	
	53	3	26	143	20	6	168	18	54	1	3	3	400	
	53	2	63	143	20	24	168	18	55	1	3	3	300	
	53	2	63	143	20	24	168	18	55	1	3	3	500	

	53	2	63	143	20	24	168	18	55	1	3	3	600	
	53	2	63	143	20	24	168	18	55	1	3	3	700	
	53	1	1	143	20	72	167	19	4	1	3	3	100	
	52	59	94	143	21	10	166	19	9	4	3	3	400	
	52	55	70	143	22	57	166	19	30	1	1	3	1000	
	52	55	70	143	22	57	166	19	30	1	3	3	300	
	52	55	70	143	22	57	166	19	30	1	3	3	500	
	52	54	83	143	22	87	166	19	34	1	2	3	800	
	52	54	83	143	22	87	166	19	34	1	3	3	1000	
	52	54	83	143	22	87	166	19	34	1	3	3	600	
	52	50	56	143	24	20	170	20	0	1	3	3	3000	
	52	50	56	143	24	20	170	20	0	1	3	3	2000	
	52	50	56	143	24	20	170	20	0	1	3	3	1500	
	52	50	56	143	24	20	170	20	0	1	2	3	4000	
Sep 15	52	48	22	143	22	52	345	8	34	1	3	3	400	
	52	49	89	143	22	96	356	9	8	1	9	9	400	
	52	50	70	143	22	95	358	9	14	1	9	9	200	
	52	50	70	143	22	95	358	9	14	1	9	9	3000	
	52	51	57	143	22	95	358	9	20	1	9	9	3000	
	52	52	17	143	22	92	5	9	24	1	9	9	300	
	52	54	50	143	22	3	342	9	49	1	9	9	200	
	52	54	93	143	21	82	342	9	51	2	9	9	900	
	52	56	26	143	21	20	70	10	0	1	3	3	200	
	52	59	68	143	20	69	346	11	28	1	9	9	1000	
	53	0	6	143	20	55	345	11	31	2	10	9	600	
	53	0	73	143	20	31	345	11	36	1	9	9	700	
	53	2	50	143	19	70	342	11	48	2	11	7	200	
	53	3	80	143	19	24	346	12	0	1	3	3	1200	
	53	10	42	143	17	90	352	13	0	6	12	12	700	
	53	12	96	143	17	74	323	13	33	4	1	2	3000	
	53	12	25	143	17	49	325	13	36	1	9	9	2000	
	53	12	25	143	17	49	325	13	36	1	9	9	1500	
	53	13	31	143	17	68	52	14	0	1	10	9	1000	
	53	13	31	143	17	68	52	14	0	2	2	3	400	
	53	13	6	143	17	93	178	14	5	1	3	3	800	
	53	13	6	143	17	93	178	14	5	1	3	3	2000	
	53	13	6	143	17	93	178	14	5	1	3	3	2000	
	53	13	6	143	17	93	178	14	5	1	3	3	600	
	53	12	8	143	18	8	177	14	15	2	9	9	500	
	53	12	8	143	18	8	177	14	15	1	2	3	200	
	53	11	7	143	18	20	177	14	18	1	3	3	300	
	53	11	7	143	18	20	177	14	18	1	3	3	400	
	53	10	30	143	18	30	176	14	22	1	3	3	300	
	53	5	88	143	20	81	152	14	50	1	3	3	2000	
	53	5	88	143	20	81	152	14	50	1	3	3	300	
	53	4	66	143	21	87	152	14	55	1	3	3	700	
	53	4	32	143	22	21	152	15	0	2	3	3	800	
	53	3	54	143	22	89	154	15	4	1	3	3	1500	
	53	1	1	143	25	8	156	15	20	7	3	3	7000	all lone individuals
	52	49	91	143	29	52	258	18	30	6	1	1	8000	one pair, others lone individuals
	52	49	46	143	25	9	262	18	56	2	9	9	300	
	52	48	97	143	24	43	170	19	10	4	3	3	3000	one at a time; all 6 counted repeatedly
Sep 16	52	49	23	143	25	3	323	16	25	2	9	9	4000	
	52	49	49	143	24	49	192	17	0	2	11	11	2500	
	52	52	34	143	23	50	351	17	30	1	9	9	800	
Sep 17	53	23	99	143	16	40	144	14	12	1	8	10	400	
	53	23	34	143	17	30	151	14	14	1	4	3	400	
	53	23	26	143	17	47	136	14	23	1	12	12	300	

	53	23	26	143	17	47	136	14	23	1	4	4	500	
	53	23	16	143	16	20	204	14	53	1	9	9	200	
	53	22	707	143	15	62	205	14	57	1	7	7	200	
	53	22	36	143	15	21	206	15	0	1	9	9	500	
	53	22	59	143	14	93	170	15	15	1	9	9	400	
	53	22	59	143	14	93	170	15	15	1	10	10	400	
	53	22	32	143	15	48	149	15	32	1	9	9	400	
	53	22	32	143	15	48	149	15	32	2	11	11	300	
	53	21	69	143	16	26	153	15	40	1	3	3	600	
	53	21	69	143	16	26	153	15	40	1	10	10	200	
	53	20	88	143	17	33	152	15	45	1	3	3	300	
	53	20	36	143	18	1	152	16	0	1	3	3	500	
	53	20	36	143	18	1	152	16	0	1	12	12	200	
	53	19	59	143	17	23	195	16	40	1	3	3	500	
	53	19	59	143	17	23	195	16	40	1	9	9	500	
Sep 18	53	26	28	143	10	85	156	10	0	1	11	9	200	
	53	20	25	143	14	22	182	11	41	1	9	9	200	
	53	16	32	143	19	69	191	11	50	1	3	3	3000	
	53	16	32	143	19	69	191	11	50	1	3	3	2000	
	53	15	60	143	19	37	49	12	0	1	6	6	5000	
	53	15	72	143	19	1	187	12	16	1	9	9	800	visibility toward the sea 6-8 km, mist
	53	14	54	143	18	56	187	12	25	2	3	3	300	
	53	14	54	143	18	56	187	12	25	1	3	3	3000	
	53	14	54	143	18	56	187	12	25	1	9	9	600	
	53	14	54	143	18	56	187	12	25	1	3	3	2000	
	53	14	20	143	19	24	142	12	50	2	3	3	300	
	53	13	82	143	19	87	137	13	0	2	9	9	500	
	53	13	55	143	20	28	137	13	5	4	3	3	700	
	53	12	91	143	19	54	209	13	30	1	2	2	5000	
	53	12	49	143	19	11	213	13	33	2	1	1	600	
	53	12	25	143	19	91	71	13	45	1	3	3	500	
	53	12	25	143	19	91	71	13	45	3	12	12	1500	
	53	9	30	143	21	24	175	14	35	1	3	3	2000	
	53	8	11	143	21	42	176	14	40	3	4	4	1500	whales were moving 100-200 m apart (one behind another)
	53	8	11	143	21	42	176	14	40	3	3	3	500	frequent swells of 1 m, mist
	52	59	63	143	22	63	175	15	25	4	3	3	2000	
	52	51	92	143	23	98	176	16	12	2	3	3	2000	
	52	50	24	143	24	28	173	16	20	2	3	3	2500	spouting of one half as large and disperses 3 times faster
Sep 19	53	5	80	143	21	80	321	10	0	2	2	3	2000	
	53	7	70	143	22	19	319	11	0	4	3	3	2500	
	53	8	40	143	21	18	318	11	7	4	11	9	5000	whales playing and moving north
Sep 20	52	49	93	143	29	95	7	11	0	1	9	9	1000	
	52	51	45	143	24	32	350	13	15	1	9	9	600	
	52	51	45	143	24	32	350	13	15	2	9	9	3500	
	52	52	96	143	23	75	344	13	20	1	10	9	4000	
	52	52	96	143	23	75	344	13	20	1	9	9	4000	
	52	52	96	143	23	75	344	13	20	1	8	9	4000	
	52	53	76	143	23	40	344	13	27	1	9	9	4000	
	52	53	76	143	23	40	344	13	27	1	10	9	4000	
	52	22	67	143	34	74	152	16	42	1	9	9	1000	
	52	20	7	143	41	88	116	18	0	2	9	9	800	
Sep 21	52	17	92	143	41	96	91	10	20	2	9	9	200	
	52	7	50	143	36	66	271	14	54	1	9	9	4000	
	52	7	51	143	31	68	271	15	10	1	9	9	6000	
	52	3	93	143	32	74	90	15	41	2	9	9	300	
	52	3	93	143	36	51	87	15	44	1	3	3	900	
	52	0	46	143	37	86	272	17	0	1	3	3	400	

	52	12	81	143	38	0	346	20	0	1	2	3	150	
Sep 22	52	52	40	143	22	25	212	7	45	1	3	2	200	
	52	52	40	143	22	25	214	7	45	2	10	10	1000	
	52	52	40	143	22	25	214	7	45	1	10	10	1000	
	52	52	40	143	22	25	198	8	0	1	5	3	300	
	52	52	40	143	22	25	210	8	0	1	11	11	2000	
	52	52	40	143	22	25	210	8	0	1	11	11	2000	
	52	52	40	143	22	25	210	8	50	1	5	5	2000	
Sep 23	53	16	92	143	17	31	346	8	0	3	8	8	1500	16 gray whales within a 2-3 mile radius, 5 out at sea (as much as 3 miles) and the others near shore; one group of 4 (feeding side by side), another of 3, one pair playing, the others feeding alone
	53	15	41	143	16	22	230	10	0	1	9	9	6000	
	53	15	41	143	16	22	230	10	0	1	9	9	6000	this is a repetition to determine range
	53	9	93	143	18	44	167	15	0	1(1)	3	3	400	
	53	9	93	143	18	44	167	15	0	4	3	3	800	all 4 lone whales; even right at shore (1)
	53	9	93	143	18	44	167	15	0	3	1	1	1500	
	53	8	37	143	20	8	83	15	25	2	3	3	700	
	53	8	37	143	20	8	83	15	25	2	3	4	1000	
	53	8	37	143	20	8	83	15	25	1	5	5	1000	
	53	8	37	143	20	8	83	15	25	1	4	4	1500	
	53	7	53	143	20	26	167	16	0	4	3	3	1000	one at a time 300 to 1000 m apart
	53	7	53	143	20	26	167	16	0	2	2	2	1500	
	53	4	32	143	20	14	180	17	0	2	12	9	500	playing
	53	3	32	143	20	14	244	17	5	1	9	9	1500	
	53	3	32	143	20	14	244	17	5	1	3	3	1500	all whales were moving slowly north after 3:00 p.m. showing entire body at the surface
	53	0	76	143	20	45	167	17	25	1	3	3	700	
	53	0	76	143	20	45	167	17	25	1	3	3	800	
	53	0	76	143	20	45	167	17	25	1	9	9	500	all 3 whales resting
	52	57	98	143	21	76	166	17	38	1	3	3	800	
	52	55	59	143	22	21	165	17	45	3	3	3	900	side by side but not playing
	52	54	5	143	22	68	165	17	55	2	3	3	1000	
	52	54	5	143	22	68	165	17	55	1	3	3	1200	
	52	53	33	143	22	87	167	18	0	1	3	3	1000	
	52	52	46	143	23	15	166	18	1	1	3	3	1000	
	52	52	46	143	23	15	166	18	1	2	3	3	200	
	52	52	46	143	23	15	166	18	1	2	2	2	300	
	52	52	46	143	23	15	166	18	1	2	3	3	900	
	52	49	54	143	24	7	166	18	13	3	3	3	1500	
Sep 24	53	25	6	143	12	2	204	9	0	7	9	9	1500	all feeding individually
	53	23	50	143	12	78	161	10	0	1	9	9	600	
	53	23	50	143	12	78	161	10	0	1	3	3	300	
	53	22	70	143	13	19	172	10	5	1	3	3	2000	
	53	22	70	143	13	19	172	10	5	1	2	2	2000	
	53	22	70	143	13	19	172	10	5	1	3	3	1500	
	53	22	70	143	13	19	172	10	5	1	3	3	900	
	53	22	56	143	13	28	61	10	17	1	12	12	2000	
	53	22	56	143	13	28	61	10	17	1	9	9	300	
	53	21	29	143	14	59	230	12	0	2	12	12	3000	
	53	21	29	143	14	59	230	12	0	1	12	12	1000	
	53	20	19	143	15	73	161	12	25	1	3	3	2550	
	53	20	19	143	15	73	161	12	25	1	3	3	2000	
	53	20	19	143	15	73	161	12	25	1	2	2	2500	
	53	17	45	143	16	70	169	12	40	1	3	3	1500	
	53	17	45	143	16	70	169	12	40	2	2	3	1500	
	53	17	45	143	16	70	169	12	40	1	3	3	2000	
	53	16	6	143	17	10	170	12	50	1	9	9	200	

	53	16	6	143	17	10	170	12	50	1	2	3	1500	
	53	16	6	143	17	10	170	12	50	1	2	3	1500	
	53	16	6	143	17	10	170	12	50	1	3	3	400	
	53	16	6	143	17	10	170	12	50	1	10	9	700	
	53	13	49	143	17	79	171	13	0	1	9	9	400	
	53	13	49	143	17	79	171	13	0	1	3	3	1500	
	53	13	49	143	17	79	171	13	0	1	3	3	1000	
	53	12	43	143	18	14	179	13	8	1	2	3	1000	
	53	10	48	143	18	19	179	13	15	1	3	3	2000	
	53	10	48	143	18	19	179	13	15	1	9	9	1500	
	53	8	85	143	18	22	179	13	25	1	3	3	300	
	53	8	85	143	18	22	179	13	25	1	9	9	1000	
	53	8	85	143	18	22	179	13	25	2	3	3	100	
	53	8	85	143	18	22	179	13	25	1	9	9	300	
	53	6	79	143	18	24	178	13	34	2	9	9	400	
	53	6	79	143	18	24	178	13	34	1	9	9	300	
	53	4	91	143	18	59	164	13	47	3	9	9	300	
	53	0	31	143	19	93	169	14	26	1	9	9	400	
	52	59	22	143	20	23	170	14	33	2	9	9	200	
	52	55	87	143	21	7	171	14	50	1	3	4	200	
	52	52	72	143	21	87	168	15	7	2	3	3	500	
	52	52	72	143	21	87	168	15	7	1	3	3	400	
	52	52	72	143	21	87	168	15	7	1	9	9	800	
	52	52	72	143	21	87	168	15	7	1	3	3	900	
	52	51	80	143	22	16	168	15	12	1	4	4	300	
Sep 28	52	39	23	143	23	5	191	8	0	1	2	3	600	
	52	43	44	143	22	32	328	16	10	1	3	3	400	
	52	51	98	143	23	33	343	17	43	2	9	9	800	
	52	52	87	143	22	92	344	17	46	1	9	9	200	
	52	52	87	143	22	92	344	17	46	3	9	9	1000	
	52	54	95	143	21	97	344	18	0	3	9	9	300	individually, one after another, every 75-100 m
	52	57	78	143	20	70	343	18	15	1	9	9	400	all whales observed were moving southward
Sep 29	53	5	84	143	19	41	204	8	0	1	5	1	800	
	53	5	84	143	19	41	204	8	0	1	11	11	800	
	53	8	35	143	19	89	45	9	35	1	2	2	500	
	53	8	35	143	19	89	45	9	35	1	11	11	800	
	53	8	88	143	18	56	275	10	0	1	3	3	300	
	53	8	91	143	18	56	275	10	10	1	1	11	300	
	53	8	91	143	18	56	275	10	10	1	1	11	600	
	53	9	21	143	18	48	342	10	33	1	11	11	700	
	53	7	91	143	19	64	175	12	0	2	3	3	3000	
	53	7	91	143	19	64	175	12	0	1	3	3	3100	
	53	3	49	143	20	52	178	12	30	1	3	3	500	
	53	1	43	143	20	97	191	12	48	1	3	3	300	
	53	1	43	143	20	97	191	12	48	2	9	9	1000	
	53	0	85	143	23	4	180	14	30	1	3	3	800	
	53	0	85	143	23	4	180	14	30	1	3	3	500	
	53	0	85	143	23	4	180	14	30	1	9	9	200	
	53	0	85	143	23	4	180	14	30	2	9	9	500	
	52	56	83	143	23	10	180	14	43	1	4	4	700	
	52	56	83	143	23	10	180	14	43	1	3	3	5000	
	52	56	83	143	23	10	180	14	43	2	2	2	6000	
Sep 30	52	10	29	143	36	27	172	8	0	1	1	1	2000	
	52	15	32	143	34	96	324	9	40	2	3	3	400	
	52	21	35	143	34	81	338	9	0	1	9	9	800	
	52	17	85	143	33	78	196	11	0	1	9	9	300	

	52	18	60	143	32	24	142	14	0	1	1	3	200	
	52	3	63	143	38	18	69	15	0	1	11	9	400	
	52	11	12	143	41	6	7	16	0	1	9	9	4000	
	52	12	5	143	41	24	9	16	3	1	9	9	2000	
	52	22	7	143	40	35	340	17	16	2	9	9	2000	
Oct 1	52	52	81	143	21	83	340	8	0	3	3	3	800	playing
	52	52	81	143	21	83	340	8	0	1	11	11	1000	
	52	52	81	143	21	83	340	8	0	1	7	7	3000	
	52	52	81	143	21	83	340	8	0	1	6	6	2500	
	52	52	87	143	20	81	348	8	35	1	2	2	1500	
	52	52	87	143	20	98	99	8	52	1	3	3	2000	
	52	52	60	143	20	81	120	9	0	1	10	10	1000	
	52	52	60	143	20	81	120	9	0	2	10	10	4000	
	52	54	65	143	21	35	351	9	38	1	9	9	100	
	52	54	65	143	21	35	351	9	38	1	3	3	1500	
	52	55	92	143	20	97	350	9	45	1	3	9	100	
	52	58	5	143	20	38	353	10	0	2	3	3	1000	
	53	0	97	143	19	88	352	10	15	1	3	3	300	
	53	0	97	143	19	88	352	10	15	2	3	3	1500	second pair playing
	53	2	27	143	19	34	352	10	23	1	3	3	500	
	53	3	29	143	19	12	38	11	25	1	1	1	6000	
	53	6	86	143	19	11	354	12	17	1	10	9	600	
	53	7	75	143	18	91	338	12	25	2	9	9	300	playing and moving south
	53	12	95	143	18	44	20	13	52	1	10	9	2500	
	53	13	78	143	19	54	20	14	0	1	9	9	5000	
	53	18	88	143	19	61	335	14	30	2	9	9	700	
	53	22	53	143	19	23	338	15	0	1	9	9	3500	
	53	27	53	143	10	87	345	16	0	2	10	9	1500	
	53	27	53	143	10	87	345	16	0	1	9	9	1500	
	53	29	61	143	9	18	346	16	30	2	10	10	800	
	53	29	61	143	9	18	337	16	30	2	11	11	1500	
	53	31	71	143	7	40	329	17	0	2	9	9	2200	whales started out to sea together
Oct 2	53	3	12	143	21	4	178	8	0	2	3	3	600	
	53	3	12	143	21	4	178	8	0	1	3	3	3500	
	52	58	28	143	21	92	178	8	25	1	9	9	200	
	52	59	28	143	21	92	178	8	25	1	3	3	800	
	52	57	14	143	22	11	177	8	35	1	9	10	600	sea with whitecaps, wind 210 deg., 16-17 m/sec
	52	55	24	143	22	40	177	8	45	1	9	9	800	
	52	53	3	143	22	78	178	9	0	1	3	3	500	
	52	49	73	143	23	20	182	9	17	1	3	3	3000	
	52	46	91	143	23	14	185	9	37	1	4	3	400	
	52	41	91	143	23	14	185	9	37	1	2	3	500	wind 21-23 m/sec
MINKE WHALE														
Jul 31	43	51	80	136	39	32	60	20	54	1	2	3	300	
Aug 1	45	43	62	141	48	10	91	17	15	1	11	9	400	
	45	43	1	142	2	88	70	18	28	1	12	3	300	
Aug 2	46	59	52	144	14	74	24	5	50	1	2	3	200	
	51	43	64	143	34	85	358	16	14	1	12	6	200	
Aug 6	52	55	803	143	22	32	320	13	20	1	4	2	500	
	52	55	91	143	21	55	281	13	25	1	11	9	2000	
	52	50	3	143	27	59	2	19	0	1	6	3	300	
	52	58	84	143	21	56	160	20	46	1	3	3	100	
Aug 7	53	25	865	143	11	372	340	7	0	1	12	3	20	
Aug 13	52	39	54	143	29	8	301	17	20	1	3	3	500	
	52	42	92	143	27	97	78	18	46	1	3	3	600	
Aug 15	52	39	66	143	30	9	138	16	0	1	12	3	50	

Aug 16	52	35	96	143	30	38	86	7	30	1	9	9	200	
	52	38	42	143	26	42	276	10	0	1	9	9	100	
	52	49	56	143	25	67	148	11	36	1	2	3	100	
Aug 17	52	49	22	143	24	83	194	9	0	2	9	9	150	
	52	49	45	143	22	39	359	13	20	1	1	3	300	
	52	52	30	143	22	8	24	13	44	1	1	3	600	
	53	2	88	143	19	42	360	16	33	1	11	9	400	
	53	3	83	143	19	24	360	16	38	1	10	9	1500	
	53	3	83	143	19	24	360	16	38	1	11	9	400	
	53	6	47	143	18	55	360	15	54	2	10	9	500	
	53	7	21	143	18	35	360	16	0	1	1	3	400	
	53	7	21	143	18	35	360	16	0	1	10	9	200	
	53	11	91	143	17	36	360	16	25	1	10	9	300	
	53	11	91	143	17	36	360	16	25	1	11	9	400	
	53	13	66	143	16	94	360	16	36	1	11	9	1000	
Aug 19	52	54	17	143	24	7	304	9	25	1	10	9	3000	
Aug 20	52	54	86	143	35	22	129	6	25	1	11	9	100	
	52	49	55	143	25	95	215	17	12	1	11	12	100	
	52	50	77	143	25	16	217	18	42	1	2	12	70	
Aug 21	52	41	24	143	22	52	338	17	0	1	9	11	200	
Aug 22	52	25	5	143	38	28	90	6	26	1	11	12	700	
	52	17	96	143	41	83	90	9	10	1	9	12	500	
Aug 26	52	54	19	143	24	82	347	15	0	1	10	7	150	
	53	12	3	143	19	47	54	19	40	1	9	9	100	
Aug 29	52	56	7	143	21	60	175	8	0	1	1	3	400	
Aug 30	52	54	69	143	31	1	186	10	0	1	1	3	600	
	53	2	50	143	23	30	80	13	42	1	10	9	200	
	52	55	88	143	23	40	179	14	25	1	1	3	200	
Sep 4	53	17	95	143	17	2	170	11	14	2	3	3	300	
	53	13	40	143	18	4	173	11	48	1	3	3	300	
	52	55	62	143	22	40	160	14	0	1	9	9	100	
Sep 5	52	55	57	143	21	76	227	8	0	1	9	9	300	
	52	55	96	143	28	17	87	9	28	1	11	9	100	
	52	54	80	143	23	66	348	12	35	2	9	9	400	
	52	55	55	143	23	41	348	12	40	2	9	11	200	
	52	57	12	143	22	91	348	12	50	1	3	3	500	
	53	0	84	143	21	78	356	13	20	1	3	3	400	
	53	5	41	143	21	1	345	15	30	1	9	9	200	
	53	10	51	143	18	86	345	16	2	1	9	9	200	
	53	12	55	143	18	20	345	16	13	1	3	3	400	
Sep 7	52	24	39	143	23	37	336	19	0	1	2	3	100	
Sep 8	52	41	14	143	22	8	120	7	0	1	3	3	100	
	52	59	31	143	21	65	298	14	31	1	9	10	100	
Sep 10	53	17	82	143	17	3	136	10	38	1	3	3	800	
	53	11	83	143	23	83	355	15	0	1	9	11	200	
	53	11	61	143	22	8	359	16	12	1	2	3	100	
Sep 11	52	54	13	143	25	50	50	9	0	1	3	3	300	
	53	16	32	143	16	39	346	11	48	1	2	3	200	
	53	0	63	143	22	95	168	18	15	2	2	3	100	
	53	0	63	143	22	95	168	18	15	1	3	3	150	
Sep 13	53	14	93	143	21	94	220	10	0	1	6	6	200	
	53	29	52	143	10	99	316	16	30	1	9	9	200	
Sep 14	52	54	65	143	34	99	106	7	0	2	3	9	100	
	52	59	94	143	21	10	166	19	9	1	2	3	200	
Sep 15	52	58	17	143	21	19	346	11	23	1	1	3	200	
	53	11	42	143	18	76	27	13	19	1	9	9	300	
	53	10	30	143	17	30	176	14	22	1	9	9	600	
	53	4	32	143	22	21	152	15	0	1	3	3	500	

	52	43	35	143	26	40	114	20	0	1	3	3	400	
Sep 18	53	14	54	143	18	56	187	12	25	1	3	3	200	
Sep 24	52	55	87	143	21	7	171	14	50	1	3	9	500	
Oct 5	44	33	90	136	15	3	271	8	50	1	2	3	100	
	44	33	90	136	15	3	271	8	0	1	11	11	3000	
	44	34	3	136	12	4	144	11	0	1	9	3	300	
Oct 6	42	48	50	133	46	51	248	10	37	1	2	4	200	
KILLER WHALE														
Aug 3	51	37	7	143	35	78	360	15	36	3	12	6	400	1 bull and 2 cows in group
Aug 25	51	37	76	143	36	0	351	16	0	4	9	12	600	1 bull, 2 cows and calf in group
Sep 21	52	25	3	143	40	8	94	7	34	3	3	3	200	bull, cow and calf in group
Sep 23	53	13	84	143	20	67	75	11	23	1	1	3	200	bull
Oct 3	48	52	65	144	46	49	158	8	0	3	10	10	1000	bull, 2 cows
	48	52	65	144	46	49	158	8	0	3	9	9	1500	bull, cow and calf
	48	52	65	144	46	49	158	8	0	2	9	9	800	bull and cow
	48	19	7	144	53	29	204	11	0	3	12	11	400	bull and 2 cows
COMMON HARBOR PORPOISE														
Aug 7	53	5	20	143	19	4	174	9	42	1	1	3	30	
Aug 15	52	28	17	143	19	22	119	8	0	1	11	9	40	
Aug 16	52	44	5	143	23	76	40	10	46	1	1	3	100	
	52	45	45	143	27	38	22	11	0	1	12	9	200	
	52	49	97	143	28	91	104	12	0	1	1	3	100	
Aug 17	52	49	22	143	24	84	204	9	10	1	1	3	100	
	52	44	67	143	28	68	184	10	5	1	11	9	50	
	52	46	61	143	22	16	358	13	0	2	11	9	500	
	52	52	30	143	22	8	24	13	44	2	11	9	200	
Aug 18	51	56	68	143	50	26	360	8	46	4	1	3	800	
Aug 20	52	52	54	143	31	97	185	16	0	1	10	9	75	
Aug 21	52	46	40	143	26	22	2	18	24	2	12	9	30	
Aug 22	52	21	72	143	56	57	360	19	24	1	12	10	60	
Aug 23	52	24	0	143	50	56	169	10	0	3	9	9	100	
Aug 26	53	12	9	143	18	12	256	19	24	1	1	3	100	
Aug 30	53	0	39	143	22	68	355	12	0	5	9	9	400-500	one at a time
	53	4	82	143	22	91	355	12	26	4	11	9	200	
Sep 4	53	13	40	143	18	4	173	11	48	2	3	3	200	
Sep 5	52	54	80	143	23	66	348	12	35	4	1	12	200	
	52	57	12	143	22	91	348	12	50	12	1	3	100	
	53	4	63	143	21	32	346	15	26	3	11	9	100	
Sep 7	52	19	99	143	32	99	212	9	0	1	10	9	100	
	52	22	35	143	35	30	319	10	0	3	11	9	200	
Sep 8	52	49	49	143	24	16	168	11	0	2	11	9	100	
	52	49	54	143	23	97	354	11	40	4	1	3	20	
	52	53	6	143	23	74	356	12	0	2	9	9	200	
Sep 11	52	56	53	143	24	75	328	9	46	22	12	1	300	one at a time
Sep 12	53	8	7	143	17	5	348	6	43	4	2	4	200	
	53	27	64	143	12	8	348	8	30	2	2	3	200	
	53	31	95	143	9	3	324	8	53	4	9	9	100	
	53	21	83	143	13	53	145	15	20	2	9	9	30	
	53	16	4	143	16	13	140	15	50	2	9	9	40	
	53	11	6	143	17	39	172	16	15	4	3	3	50	
Sep 14	53	3	34	143	20	20	309	9	0	4	8	10	70	
	53	3	22	143	19	2	353	10	0	4	12	5	30	
	53	9	19	143	18	19	347	11	0	3	11	8	70	
Sep 28	52	44	9	143	26	33	356	17	0	10	9	9	300	two at a time
Oct 3	47	15	99	144	16	17	201	17	0	6	9	11	150	
DALL PORPOISE														

Aug 2	47	9	16	144	20	12	24	6	45	3	10	3	50	
HARBOR SEAL														
Aug 6	52	55	923	143	20	632	262	14	22	1	1	3	40	
	52	53	116	143	21	329	269	15	26	1	2	3	50	
Sep 3	54	5	9	142	27	64	242	10	0	1	12	12	20	
Sep 11	53	16	32	143	16	39	346	11	48	4	3	3	100	
RINGED SEAL														
Aug 4	52	20	60	143	43	4	145	13	54	1	11	10	20	
	52	41	55	143	23	56	218	9	30	1	11	10	40	
	52	50	3	143	27	59	2	19	0	1	12	3	30	
Aug 8	52	19	40	143	34	95	170	11	0	1	2	3	30	
	52	14	38	143	37	17	167	12	0	2	3	3	70	
Aug 13	52	43	52	143	38	17	96	10	30	1	11	9	50	
Aug 14	51	58	3	143	42	28	359	10	0	1	9	9	30	
Aug 17	52	49	19	143	24	83	244	8	0	1	3	3	40	
	52	48	67	143	28	71	180	9	42	1	1	3	20	
	52	42	19	143	21	76	4	12	36	1	10	9	50	
	52	58	82	143	20	82	360	15	46	2	9	9	40	
	52	58	82	143	20	82	360	15	46	2	9	9	40	
	53	6	47	143	18	55	360	15	54	4	2	3	50	one at a time
	53	24	26	143	12	3	360	17	43	1	11	9	100	
Aug 18	52	4	14	143	31	86	270	12	31	4	11	9	60	
	52	6	48	143	29	91	360	12	52	4	2	3	100	
	52	11	13	143	42	29	270	14	40	3	1	3	30	
	52	11	2	143	36	0	270	15	0	21	11	9	50	sighted regularly, one at a time
Aug 20	52	50	77	143	25	16	217	18	42	1	9	9	75	
	52	50	77	143	25	16	217	18	42	1	2	3	40	
Aug 21	52	46	84	143	26	36	173	14	29	3	11	11	70	
	52	41	24	143	22	52	338	18	0	1	10	10	30	
Aug 22	52	14	51	143	47	34	270	10	0	1	9	9	70	
	52	11	13	143	29	74	90	11	10	1	11	11	70	
	52	10	76	143	37	57	90	11	31	1	2	2	50	
Aug 24	51	37	98	143	42	50	168	12	0	1	11	9	30	
Aug 25	51	37	76	143	36	0	351	16	0	1	12	9	20	
Aug 27	53	6	19	143	19	93	177	8	0	1	3	3	50	
	53	3	41	143	19	87	184	9	16	1	3	3	40	
	53	1	16	143	19	54	204	10	0	1	3	3	30	
	52	56	26	143	21	12	180	14	0	6	1	3	40	individually
Aug 30	52	54	66	143	30	37	268	11	0	1	3	3	40	
	52	55	18	143	25	63	263	11	16	1	10	9	70	
Sep 5	52	57	12	143	22	91	348	12	50	3	10	10	200	
	53	4	3	143	21	56	346	15	23	3	11	9	200	
	53	19	15	143	15	5	166	19	15	1	9	9	70	
Sep 6	52	50	90	143	25	65	272	12	0	1	3	3	30	
	52	30	74	143	34	52	151	14	42	1	3	3	20	
	52	9	70	143	43	30	200	19	20	1	3	3	40	
Sep 7	52	21	37	143	35	33	290	15	0	1	10	10	20	
Sep 8	52	53	57	143	23	62	324	12	10	1	9	9	30	
Sep 9	54	6	0	142	25	91	319	19	0	1	3	3	70	
Sep 11	52	54	19	143	25	42	36	9	5	1	1	1	20	
	52	56	53	143	24	75	328	9	46	2	12	12	200	
Sep 12	53	34	30	143	6	78	340	13	0	2	10	9	40	
	53	23	93	143	12	4	128	15	0	2	3	3	700	
	53	21	83	143	13	53	145	15	20	2	9	9	40	
	53	8	96	143	17	79	172	16	6	1	9	9	70	
Sep 13	53	8	0	143	18	45	164	18	35	1	2	2	30	
Sep 14	52	56	81	143	31	48	316	8	0	6	3	3	100	

	53	0	13	143	26	85	313	8	29	2	2	3	40	
	53	0	84	143	25	77	312	8	34	4	1	3	100	
Sep 16	52	50	91	143	24	4	349	17	20	1	9	9	100	
Sep 28	52	57	78	143	20	70	343	18	15	1	9	9	30	
	52	57	78	143	20	70	343	18	15	1	3	3	40	
BEARDED SEAL														
Aug 2	48	56	4	144	49	14	344	18	40	1	11	9	100	
Aug 7	53	25	865	143	11	372	340	7	0	1	10	9	30	
Aug 17	53	24	26	143	12	3	360	17	43	1	11	9	200	
Aug 29	52	47	26	143	37	57	223	19	0	1	3	3	2	
Aug 30	52	54	64	143	31	1	194	10	25	1	11	11	100	
Sep 12	53	31	95	143	9	3	324	8	53	1	3	3	100	
Sep 18	53	15	60	143	19	37	49	12	0	1	1	3	40	
Sep 26	52	40	10	143	22	50	2	14	25	1	2	3	70	
FUR SEAL														
Aug 2	47	42	37	144	38	97	22	9	47	3	2	3	50	
	47	46	2	144	41	8	22	10	0	3	12	9	60	
	47	51	63	144	44	20	22	10	30	2	1	3	40	
	48	7	44	144	52	99	21	12	0	3	11	9	30	
	48	28	52	145	0	54	348	16	0	1	12	3	20	
	48	28	52	145	0	54	348	16	0	3	12	8	40	
	48	56	4	144	49	14	344	18	40	1	1	3	70	
Aug 24	51	37	98	143	42	50	168	12	0	1	10	9	20	
Oct 3	48	45	95	144	50	41	157	8	30	8	9	9	20	one at a time
	48	39	76	144	54	36	150	9	0	28	9	9	30	individuals in 30 min. observation
	48	35	21	144	57	26	162	9	30	18	3	3	30	individuals in 30 min. observation
	48	29	84	144	59	82	200	10	0	7	9	3	40	one at a time
STELLER'S SEA LION														
Aug 1	45	43	44	141	41	80	90	17	26	1	11	9	200	
Aug 16	52	35	96	143	30	38	86	7	30	1	9	9	70	
SEALS, undetermiend species														
Aug 3	51	18	61	143	22	51	319	7	20	2	2	3	150	

Appendix 8. Results of the onshore gray whale surveys in the Odoptu-Piltun section of the Piltun area in July-October, 2004.

1. Date **2.** Observation station number **3.** Reticle reading below the horizon
4. Cetacean Species (GW- gray whale, MW – Minke Whale, HP – Harbor porpoise)
5. Number of animals
6. Latitude north **7.** Longitude east **8.** Distance to shoreline (perpendicular from coast)

1	2	3	4	5	6	7	8
5.VII	1	2,5	GW	1	53,4137	143,20348	3233
5.VII	1	2,5	GW	1	53,41159	143,2035	3160
5.VII	3	3	GW	1	53,32475	143,25065	3153
5.VII	3	2	GW	1	53,29861	143,23468	1310
5.VII	5	8	GW	2	53,28625	143,25972	1359
5.VII	5	8	GW	1	53,28403	143,26798	1839
5.VII	5	2,5	GW	1	53,26994	143,33226	5654
5.VII	5	4	GW	3	53,26501	143,3123	4237
5.VII	5	3	GW	3	53,26931	143,32404	5106
5.VII	5	5	GW	1	53,25896	143,28268	3486
5.VII	5	1	GW	1	53,2088	143,3195	4618
5.VII	9	2	GW	2	53,23417	143,26331	1426
5.VII	9	2	GW	1	53,15012	143,28512	1381
5.VII	9	2	GW	1	53,14961	143,28729	1517
5.VII	9	2	GW	1	53,1484	143,29149	1775
5.VII	9	3	GW	1	53,12293	143,30438	2233
5.VII	9	2	GW	1	53,10432	143,29831	1543
5.VII	9	3	GW	1	53,10899	143,29193	1194
5.VII	9	2	GW	2	53,10432	143,29831	1543
5.VII	9	0,5	GW	1	53,07754	143,30094	1303
5.VII	9	0,5	GW	1	53,07723	143,29956	1207
5.VII	11	2	GW	1	53,07192	143,30964	1942
5.VII	11	3	GW	1	53,06496	143,30831	1753
5.VII	11	4	GW	1	53,06266	143,30395	1431
5.VII	11	2	GW	1	53,0677	143,31673	2351
5.VII	11	3	GW	1	53,05222	143,31615	2088
5.VII	11	3	GW	1	53,04958	143,31579	2026
5.VII	11	3	GW	2	53,04764	143,31512	1953
5.VII	11	3	GW	1	53,04668	143,31466	1909
5.VII	11	3	GW	1	53,04544	143,31392	1841
5.VII	11	3	GW	1	53,04249	143,31145	1635
5.VII	13	2	GW	1	53,00172	143,31486	1246
5.VII	13	2	GW	1	53,00143	143,31644	1347
5.VII	13	2	GW	1	53,00111	143,318	1446
5.VII	13	1	GW	1	53,00977	143,33564	2744
5.VII	13	3	GW	1	52,99332	143,32079	1518
5.VII	13	1	GW	1	53,00942	143,33667	2806
5.VII	13	1,5	GW	1	53,00213	143,33285	2447
5.VII	15	1	GW	1	52,91206	143,32296	703
6.VII	3	3	GW	1	53,363	143,22947	3012
6.VII	3	3	GW	1	53,36265	143,23028	3053
6.VII	3	1	GW	1	53,28566	143,25254	2038
6.VII	4	1	GW	1	53,25577	143,27923	
6.VII	5	5	GW	4	53,26713	143,28285	3702
6.VII	5	7	GW	1	53,26451	143,27133	2890
6.VII	5	6	GW	1	53,26515	143,27648	3239
6.VII	5	4	GW	1	53,26703	143,2917	4273
7.VII	7	1	GW	1	53,23045	143,27496	2284
7.VII	7	0,5	GW	1	53,24075	143,30277	4316
7.VII	7	5	GW	1	53,19549	143,27785	1765
7.VII	7	5	GW	1	53,19502	143,27876	1815
7.VII	7	5	GW	1	53,19477	143,27921	1839

1	2	3	4	5	6	7	8
6.VII	5	6	GW	2	53,26566	143,27642	3248
6.VII	5	5	GW	1	53,26129	143,28307	3570
6.VII	5	5	GW	1	53,26363	143,28318	3636
6.VII	5	2	GW	1	53,26275	143,32309	6201
6.VII	5	3	GW	1	53,25331	143,3024	4624
6.VII	5	4	GW	1	53,25759	143,29123	4006
6.VII	5	4	GW	1	53,23069	143,2618	1425
6.VII	9	1	GW	1	53,161	143,2928	2057
6.VII	9	4	GW	1	53,13194	143,2958	1805
6.VII	9	0,5	GW	1	53,07822	143,30368	1495
6.VII	9	1	GW	1	53,09208	143,30346	1694
6.VII	9	0,5	GW	1	53,07723	143,29956	1207
6.VII	9	0,5	GW	1	53,07754	143,30094	1303
6.VII	9	2	GW	2	53,0991	143,28111	326
6.VII	11	2	GW	1	53,07138	143,31076	2008
6.VII	11	2	GW	1	53,07424	143,30364	1578
6.VII	11	3	GW	1	53,06496	143,30831	1753
6.VII	11	4	GW	1	53,06161	143,30536	1509
6.VII	11	5	GW	1	53,05634	143,30541	1435
6.VII	11	3	GW	1	53,05354	143,3161	2104
6.VII	11	1	GW	1	53,021	143,31278	1411
6.VII	11	1	GW	1	53,02043	143,31094	1280
6.VII	11	1	GW	2	53,0194	143,30716	1015
6.VII	11	0,5	GW	2	53,00602	143,30145	442
6.VII	13	2	GW	1	52,99952	143,32403	1823
6.VII	13	2	GW	1	52,9942	143,33588	2533
6.VII	13	3	GW	3	52,9848	143,33435	2295
6.VII	13	27	GW	2	52,97571	143,30762	387
6.VII	13	2	GW	1	52,95695	143,33944	2229
6.VII	15	2	GW	2	52,89532	143,3454	1918
6.VII	15	2,5	GW	1	52,88683	143,34782	1939
6.VII	15	3	GW	1	52,87524	143,3427	1408
6.VII	15	2	GW	1	52,86673	143,34151	1189
7.VII	3	5	GW	1	53,32897	143,23559	2327
7.VII	3	5	GW	1	53,32774	143,23499	2250
7.VII	3	3	GW	2	53,31469	143,24199	2284
7.VII	3	3	GW	1	53,31924	143,24679	2733
7.VII	3	3	GW	2	53,31421	143,24139	2230
7.VII	5	2	GW	1	53,3208	143,23002	1620
7.VII	5	2	GW	1	53,32054	143,2367	2046
7.VII	5	15	GW	1	53,27221	143,24639	1465
7.VII	5	5	GW	1	53,26771	143,28273	3709
7.VII	5	2	GW	1	53,26675	143,32294	6292
7.VII	5	15	GW	1	53,26101	143,25099	1483
7.VII	5	5	GW	2	53,25723	143,28221	3413
7.VII	5	6	GW	1	53,2438	143,26405	1899
7.VII	7	1	GW	1	53,2317	143,25842	1225
8.VII	15	4	GW	1	52,89066	143,33517	1162
8.VII	15	2	GW	1	52,88857	143,35168	2224
8.VII	15	1	GW	1	52,89209	143,36656	3269
8.VII	15	2	GW	1	52,8899	143,35087	2192
8.VII	15	3	GW	1	52,88039	143,34526	1663

7.VII	7	2	GW	1	53,14928	143,29166	1733
7.VII	9	2	GW	1	53,15138	143,27685	854
7.VII	9	2	GW	1	53,15113	143,27914	1001
7.VII	9	2	GW	1	53,14996	143,28585	1426
7.VII	9	2	GW	1	53,15056	143,28291	1241
7.VII	9	7	MW	1	53,12732	143,28803	1220
7.VII	9	2	GW	1	53,10555	143,30064	1717
7.VII	11	5	GW	1	53,04218	143,29811	746
7.VII	13	2	GW	1	53,00158	143,31565	1297
7.VII	13	5	GW	1	52,98943	143,30682	534
7.VII	13	5	GW	1	52,97865	143,32656	1688
7.VII	13	5	GW	1	52,97603	143,32743	1708
7.VII	13	3	GW	1	52,97904	143,33789	2446
7.VII	13	4	GW	1	52,97067	143,33151	1901
7.VII	15	1	GW	1	52,91178	143,32726	984
7.VII	15	3	GW	1	52,86797	143,32992	440
8.VII	3	8	GW	1	53,34719	143,21661	1693
8.VII	5	4	GW	1	53,23181	143,26462	1636
8.VII	7	18	GW	1	53,18675	143,25767	265
8.VII	7	2	GW	1	53,21656	143,262	1153
8.VII	7	5	GW	1	53,16937	143,28577	1754
8.VII	9	1	GW	1	53,09108	143,30054	1486
8.VII	11	1	GW	3	53,05388	143,34399	3957
8.VII	11	1	GW	1	53,05201	143,34403	3933
8.VII	11	1	GW	2	53,02521	143,32305	2152
8.VII	11	1	GW	1	53,02226	143,31636	1667
8.VII	11	1	GW	2	53,021	143,31278	1411
8.VII	11	1	GW	1	53,0213	143,31369	1476
8.VII	11	1	GW	2	53,02016	143,31001	1215
8.VII	11	1	GW	1	53,0199	143,30906	1148
8.VII	11	1	GW	1	53,01964	143,30812	1082
8.VII	11	1	GW	1	53,0194	143,30716	1015
8.VII	11	1	GW	1	53,01835	143,30228	676
8.VII	11	1	GW	1	53,01895	143,30523	880
8.VII	13	3	GW	1	52,99498	143,31503	1160
8.VII	13	2	GW	1	53,00076	143,31954	1543
8.VII	13	2	GW	1	52,99996	143,32256	1732
8.VII	13	1	GW	1	53,00905	143,33768	2868
8.VII	13	4	GW	2	52,98556	143,32566	1729
8.VII	13	4	GW	2	52,98531	143,32598	1747
8.VII	13	3	GW	1	52,98771	143,33123	2130
8.VII	13	2	GW	2	52,98738	143,34404	2976
8.VII	13	4	GW	1	52,96944	143,33101	1850
8.VII	13	4	GW	1	52,96537	143,32818	1603
8.VII	13	5	GW	1	52,9656	143,32305	1266
8.VII	13	2	GW	1	52,95085	143,32869	1426
8.VII	13	2	GW	1	52,95113	143,32937	1475
8.VII	13	1	GW	1	52,94024	143,33927	1975
8.VII	15	2	GW	1	52,89927	143,33792	1487
10.VII	9	2	GW	1	53,14904	143,28942	1648
10.VII	9	1	GW	1	53,15774	143,30384	2736
10.VII	9	2,5	GW	1	53,13941	143,30056	2236
10.VII	9	1,5	GW	1	53,14403	143,31179	3049
10.VII	9	2	GW	1	53,14116	143,30552	2590
10.VII	9	1,5	GW	2	53,1394	143,31666	3300
10.VII	9	1	GW	1	53,11456	143,33189	3922
10.VII	11	1	GW	1	53,03475	143,33623	3165
10.VII	13	2,5	GW	1	52,96021	143,33598	2046
10.VII	13	2,5	GW	2	52,95383	143,32532	1245
11.VII	1	7,5	GW	1	53,41522	143,17567	1538
11.VII	1	1	GW	1	53,37947	143,21277	2609
11.VII	1	1	GW	1	53,38074	143,21467	2773
11.VII	1	1	GW	1	53,37885	143,21179	2526
11.VII	1	1	GW	1	53,37648	143,20771	2186
9.VII	1	3	GW	1	53,38807	143,17211	356
9.VII	7	5	GW	1	53,1723	143,28807	1965
9.VII	9	5	GW	1	53,13918	143,27332	431
9.VII	9	10	GW	2	53,11866	143,27875	472
9.VII	9	10	GW	1	53,11831	143,27799	417
9.VII	11	2	GW	1	53,07677	143,2908	764
9.VII	11	2	GW	1	53,07645	143,29361	945
9.VII	11	2	GW	3	53,07614	143,29569	1078
9.VII	11	3	GW	1	53,04393	143,31279	1745
9.VII	11	2	GW	1	53,03039	143,30275	882
9.VII	13	3	GW	1	52,9918	143,32449	1742
9.VII	13	3	GW	1	52,99156	143,32499	1772
9.VII	13	4	GW	1	52,98764	143,32246	1547
9.VII	13	3	GW	1	52,95702	143,32479	1257
9.VII	13	2	GW	1	52,95265	143,33262	1714
9.VII	13	1	GW	1	52,93777	143,3321	1462
9.VII	15	1	GW	1	52,91139	143,33066	1204
9.VII	15	1	GW	1	52,90893	143,34204	1919
9.VII	15	1	GW	1	52,90845	143,34357	2012
9.VII	15	6	GW	1	52,89023	143,32704	616
9.VII	15	2	GW	1	52,89868	143,33938	1573
9.VII	15	3	GW	1	52,89093	143,34097	1552
9.VII	15	3	GW	1	52,89071	143,34122	1565
9.VII	15	4	GW	1	52,88816	143,3381	1316
9.VII	15	4	GW	1	52,88445	143,34026	1398
9.VII	15	4	GW	1	52,88073	143,34045	1349
9.VII	15	3	GW	1	52,875	143,34249	1391
9.VII	15	3	GW	1	52,87452	143,34206	1355
9.VII	15	2	GW	1	52,86696	143,34195	1223
10.VII	1	1	GW	1	53,44649	143,2112	4876
10.VII	3	5	GW	1	53,31521	143,21964	877
10.VII	3	5,5	GW	1	53,35775	143,20177	1082
10.VII	3	7	GW	1	53,35416	143,19915	802
10.VII	3	7	GW	1	53,32571	143,22374	1469
10.VII	3	7	GW	1	53,31837	143,21113	434
10.VII	3	4	GW	1	53,33631	143,24368	3074
10.VII	3	5	GW	1	53,33487	143,23692	2598
10.VII	3	3,5	GW	1	53,31144	143,22968	1397
10.VII	3	0,5	GW	1	53,27045	143,2645	2319
10.VII	3	1	GW	1	53,2824	143,24356	1363
10.VII	5	9	GW	1	53,24438	143,24507	683
10.VII	5	5	GW	1	53,23316	143,25111	794
10.VII	5	3	GW	1	53,22141	143,25891	1005
10.VII	5	5,5	GW	1	53,23462	143,24793	624
10.VII	5	11	GW	1	53,24618	143,23901	336
10.VII	5	25	GW	2	53,25461	143,23177	77
10.VII	5	25	GW	1	53,25477	143,23254	131
10.VII	7	2	GW	1	53,21436	143,27775	2141
10.VII	9	2,5	GW	1	53,14661	143,28446	1283
11.VII	15	2,5	GW	1	52,89332	143,34227	1678
11.VII	15	1	GW	1	52,86269	143,35735	2175
11.VII	15	1	GW	1	52,86079	143,35439	1947
12.VII	1	3	GW	1	53,3987	143,19171	1964
12.VII	3	9	GW	1	53,33307	143,22199	1590
12.VII	3	9	GW	1	53,3328	143,22193	1578
12.VII	3	4	GW	1	53,31512	143,22991	1528
12.VII	5	2,5	GW	2	53,29075	143,29936	5363
12.VII	5	6	GW	1	53,2788	143,26937	3120
12.VII	5	10	GW	1	53,25198	143,25485	1508
12.VII	7	1	GW	1	53,23155	143,26297	1520
12.VII	9	2,5	GW	1	53,1131	143,30347	2021
12.VII	9	2,5	GW	1	53,11173	143,30201	1903
12.VII	9	1,5	GW	1	53,09933	143,30039	1604
12.VII	9	1	GW	1	53,09476	143,30989	2161

11.VII	1	0,5	GW	2	53,36155	143,21551	2149
11.VII	3	2,5	GW	1	53,37212	143,21221	2201
11.VII	3	2,5	GW	1	53,37243	143,21004	2073
11.VII	3	1,5	GW	2	53,38418	143,21298	2631
11.VII	3	6	GW	2	53,35279	143,21641	1858
11.VII	3	5	GW	2	53,35503	143,21987	2149
11.VII	3	7	GW	2	53,34826	143,21924	1895
11.VII	3	12	GW	1	53,33724	143,21717	1415
11.VII	3	1	GW	1	53,34794	143,29404	6649
11.VII	3	2,5	GW	1	53,34068	143,25928	4206
11.VII	3	5	GW	1	53,33147	143,23646	2461
11.VII	3	5	GW	1	53,32613	143,23403	2137
11.VII	5	3,5	GW	2	53,30555	143,22803	1109
11.VII	5	2	GW	1	53,31964	143,24662	2667
11.VII	7	0,5	GW	1	53,24499	143,28244	3069
11.VII	7	0,5	GW	1	53,17058	143,36714	7113
11.VII	7	1	GW	2	53,16814	143,34069	5330
11.VII	7	1	GW	1	53,13287	143,29438	1579
11.VII	9	0,5	GW	2	53,16964	143,31087	3385
11.VII	9	3,5	GW	1	53,11933	143,29963	1863
11.VII	9	1	GW	1	53,09243	143,30441	1763
11.VII	9	0,5	GW	1	53,08147	143,3142	2240
11.VII	9	1	GW	2	53,09173	143,30249	1625
11.VII	11	1	GW	2	53,08817	143,2843	498
11.VII	11	1	GW	1	53,08608	143,30464	1816
11.VII	11	2,5	GW	1	53,06766	143,30965	1881
11.VII	11	2,5	GW	1	53,06685	143,31094	1955
11.VII	11	2	GW	1	53,06702	143,3176	2399
11.VII	11	1	GW	1	53,03061	143,33163	2800
11.VII	11	1	GW	1	53,05865	143,34313	3970
11.VII	11	1	GW	1	53,02161	143,31459	1540
11.VII	11	1,5	GW	1	53,02664	143,30677	1094
11.VII	13	1,5	GW	1	53,00515	143,32348	1869
11.VII	13	1,5	GW	1	53,00537	143,32259	1813
11.VII	13	1,5	GW	1	53,00468	143,32526	1980
11.VII	13	0,5	GW	1	53,02231	143,34215	3357
11.VII	13	2,5	GW	1	52,97963	143,34237	2752
11.VII	13	1	GW	1	52,94565	143,35023	2781
11.VII	15	1,5	GW	1	52,90226	143,34192	1801
13.VII	9	5	GW	3	53,12705	143,29375	1594
13.VII	11	5	GW	2	53,06535	143,28828	431
13.VII	11	3,5	GW	1	53,06877	143,29276	777
13.VII	11	4	GW	2	53,06589	143,29737	1041
13.VII	11	4	GW	1	53,06436	143,30106	1263
13.VII	11	6,5	GW	1	53,06027	143,29662	910
13.VII	11	6	GW	1	53,04505	143,29893	842
13.VII	11	5	GW	1	53,04126	143,29593	588
13.VII	13	4	GW	1	52,99078	143,31464	1073
13.VII	13	20	GW	1	52,97784	143,30744	407
13.VII	13	20	GW	1	52,97795	143,30723	395
13.VII	13	4	GW	1	52,95841	143,31633	715
13.VII	15	1,5	GW	1	52,9002	143,34633	2060
13.VII	15	2,5	GW	1	52,87514	143,3464	1653
13.VII	15	1	GW	2	52,85938	143,35183	1754
14.VII	3	3,5	GW	1	53,36627	143,19753	1081
14.VII	3	3	GW	2	53,30982	143,2346	1659
14.VII	5	5	GW	1	53,29679	143,23273	1195
14.VII	5	90	GW	1	53,26428	143,23161	309
14.VII	5	90	GW	1	53,26423	143,23164	309
14.VII	5	3,5	GW	1	53,2801	143,29182	4608
14.VII	5	5	GW	1	53,26246	143,28316	3605
14.VII	7	1,5	GW	1	53,22207	143,26923	1739
14.VII	7	5	GW	1	53,19717	143,27394	1543
14.VII	7	5	GW	1	53,19698	143,27445	1572

12.VII	11	1,5	GW	2	53,07904	143,30403	1674
12.VII	11	1,5	GW	1	53,07884	143,3048	1722
12.VII	11	1,5	GW	1	53,07633	143,31212	2170
12.VII	11	1,5	GW	1	53,07085	143,322	2746
12.VII	11	1	GW	1	53,02603	143,3246	2268
12.VII	11	1	GW	1	53,02562	143,32383	2210
12.VII	13	1	GW	1	53,01341	143,32155	1860
12.VII	13	1	GW	1	53,01298	143,3238	2004
12.VII	13	2,5	GW	1	52,99137	143,33209	2240
12.VII	13	4,5	GW	1	52,9817	143,32681	1749
12.VII	13	5	GW	1	52,9809	143,32514	1627
12.VII	13	4	GW	1	52,97192	143,33186	1943
12.VII	13	3	GW	1	52,96763	143,33699	2221
12.VII	13	3	GW	1	52,96654	143,33636	2163
12.VII	13	3,5	GW	1	52,96246	143,32855	1585
12.VII	13	1,5	GW	1	52,95392	143,34596	2618
12.VII	15	2	GW	1	52,8816	143,35337	2221
12.VII	15	1,5	GW	1	52,86848	143,3526	1955
13.VII	1	3	GW	1	53,43619	143,17451	2205
13.VII	1	3,5	GW	1	53,42407	143,18881	2677
13.VII	1	5	GW	1	53,40671	143,18313	1707
13.VII	1	2,5	GW	3	53,39483	143,19398	1970
13.VII	3	7,5	GW	1	53,3443	143,22215	1955
13.VII	3	6	GW	1	53,32622	143,22858	1794
13.VII	3	4	GW	2	53,32019	143,2366	2114
13.VII	3	2,5	GW	1	53,30561	143,2365	1647
13.VII	5	5,5	GW	2	53,29352	143,24225	1730
13.VII	5	5,5	GW	1	53,29336	143,24313	1783
13.VII	5	12	GW	1	53,25768	143,25569	1704
13.VII	5	11	GW	1	53,25655	143,25617	1707
13.VII	5	5,5	GW	1	53,25338	143,27689	2971
13.VII	7	2,5	GW	4	53,16859	143,30716	3141
13.VII	7	5	GW	1	53,1656	143,28116	1376
13.VII	7	5	GW	1	53,16533	143,28075	1344
13.VII	7	3,5	GW	1	53,15885	143,28318	1372
13.VII	7	4	GW	2	53,15988	143,27914	1128
13.VII	9	5	GW	1	53,1369	143,28337	1060
13.VII	9	4	GW	1	53,12654	143,29817	1879
13.VII	9	2	GW	1	53,12745	143,31443	2967
15.VII	5	5,5	GW	1	53,28023	143,27154	3296
15.VII	5	4	GW	1	53,27368	143,28968	4308
15.VII	5	15	GW	1	53,26775	143,25024	1603
15.VII	5	15	GW	1	53,25673	143,24856	1219
15.VII	5	6	GW	2	53,2416	143,26041	1608
15.VII	5	6,5	GW	1	53,24314	143,25916	1566
15.VII	5	6,5	GW	1	53,24348	143,25975	1612
15.VII	5	6	GW	1	53,24126	143,25977	1558
15.VII	5	3,5	GW	1	53,22952	143,26884	1853
15.VII	5	2,5	GW	1	53,21935	143,27026	1690
15.VII	7	0,5	GW	3	53,24683	143,26113	1710
15.VII	7	0,5	GW	1	53,24688	143,25917	1582
15.VII	7	0,5	GW	1	53,24668	143,26504	1963
15.VII	7	0,5	GW	1	53,24551	143,27861	2829
15.VII	7	5	GW	1	53,19153	143,28396	2085
15.VII	7	5	GW	1	53,17032	143,28662	1830
15.VII	7	1,5	GW	1	53,14348	143,29543	1863
15.VII	7	5	GW	1	53,1605	143,26891	470
15.VII	9	0,5	GW	1	53,17564	143,27855	1341
15.VII	9	5	GW	1	53,13662	143,28405	1101
15.VII	9	0,5	GW	1	53,09045	143,33248	3587
15.VII	9	10	GW	2	53,11903	143,27946	525
15.VII	11	1	GW	1	53,08586	143,30562	1878
15.VII	11	1	GW	1	53,08564	143,30658	1938
15.VII	11	1	GW	1	53,0741	143,33188	3448

14.VII	7	2,5	GW	1	53,15622	143,29391	2022
14.VII	7	2,5	GW	1	53,15198	143,28497	1350
14.VII	7	2,5	GW	1	53,15168	143,28416	1291
14.VII	9	2,5	GW	2	53,14434	143,29164	1722
14.VII	9	2,5	GW	1	53,14478	143,2905	1654
14.VII	11	1,5	GW	1	53,02846	143,31184	1457
14.VII	11	1,5	GW	1	53,02875	143,31253	1507
14.VII	13	4	GW	2	52,98974	143,31787	1272
14.VII	13	5	GW	1	52,97682	143,32725	1708
14.VII	13	4	GW	1	52,96537	143,32818	1603
14.VII	13	1,5	GW	2	52,94611	143,33172	1558
14.VII	13	1	GW	1	52,93448	143,31651	380
14.VII	15	0,5	GW	1	52,92066	143,3401	1983
14.VII	15	1	GW	1	52,9107	143,33483	1470
14.VII	15	0,5	GW	2	52,90722	143,37227	3898
14.VII	15	1,5	GW	1	52,86918	143,35338	2018
14.VII	15	1	GW	1	52,85872	143,35049	1654
15.VII	3	3	GW	1	53,35546	143,24223	3587
15.VII	3	2	GW	1	53,3242	143,26604	4115
15.VII	3	1	GW	1	53,28687	143,2554	2258
15.VII	3	1,5	GW	1	53,29589	143,24793	2068
15.VII	3	0,5	GW	1	53,26485	143,2467	1008
15.VII	5	1	GW	1	53,34067	143,21292	1008
15.VII	5	1	GW	1	53,34112	143,22422	1753
15.VII	5	25	GW	1	53,27248	143,23057	446
15.VII	5	3	GW	2	53,30807	143,24674	2385
15.VII	5	7,5	GW	2	53,28738	143,23994	1427
15.VII	5	15	GW	1	53,27221	143,24639	1465
15.VII	5	15	GW	1	53,27241	143,24613	1453
20.VII	1	1	GW	1	53,38205	143,21649	2934
20.VII	1	0,5	GW	1	53,35792	143,20624	1438
20.VII	3	1,5	GW	2	53,381	143,22967	3594
20.VII	3	2	GW	1	53,37446	143,22625	3169
20.VII	3	5,5	GW	1	53,35054	143,22427	2287
20.VII	3	1,5	GW	1	53,30456	143,2623	3257
20.VII	3	0,5	GW	1	53,28423	143,29172	4488
20.VII	3	3,5	GW	1	53,31615	143,2372	2024
20.VII	3	0,5	GW	1	53,27854	143,28228	3707
20.VII	5	4	GW	2	53,30126	143,24142	1870
20.VII	5	2,5	GW	1	53,31263	143,25028	2729
20.VII	5	2,5	GW	1	53,31154	143,25596	3070
20.VII	5	2,5	GW	2	53,27607	143,30993	5681
20.VII	5	2,5	GW	1	53,2752	143,31028	5682
20.VII	5	2,5	GW	1	53,27779	143,30914	5673
20.VII	5	3	GW	1	53,27945	143,2995	5090
20.VII	5	2,5	GW	1	53,26193	143,31254	5496
20.VII	5	2,5	GW	2	53,25661	143,3118	5316
20.VII	5	2,5	GW	2	53,25749	143,31199	5350
20.VII	5	4	GW	1	53,26095	143,29184	4130
20.VII	5	3	GW	1	53,2541	143,30269	4662
20.VII	5	1,5	GW	1	53,25012	143,3348	6644
20.VII	5	6	GW	1	53,25949	143,27611	3074
20.VII	7	1	GW	1	53,23171	143,25387	927
20.VII	7	0,5	GW	2	53,15147	143,35787	6118
20.VII	7	0,5	GW	1	53,12149	143,3125	2536
20.VII	9	4	GW	2	53,1322	143,29559	1796
20.VII	11	1	GW	1	53,08628	143,30366	1754
20.VII	11	1,5	GW	1	53,07862	143,30556	1769
20.VII	11	2,5	GW	2	53,04089	143,31457	1818
20.VII	11	4	GW	1	53,04256	143,30442	1170
20.VII	11	1	GW	1	53,02161	143,31459	1540
20.VII	11	1	GW	1	53,0213	143,31369	1476
20.VII	13	2,5	GW	1	52,95688	143,33139	1693
21.VII	1	0,5	GW	1	53,47562	143,15773	2542
15.VII	11	0,5	GW	1	53,07276	143,35608	5033
15.VII	11	0,5	GW	2	53,04938	143,3635	5185
15.VII	11	1,5	GW	1	53,03313	143,32069	2111
15.VII	11	2,5	GW	2	53,03821	143,31119	1556
15.VII	11	1	GW	1	53,02521	143,32305	2152
15.VII	13	2,5	GW	1	52,99836	143,31254	1044
15.VII	13	0,5	GW	1	53,02742	143,31557	1666
15.VII	13	1	GW	1	53,01012	143,33461	2680
15.VII	13	1	GW	1	53,01078	143,33252	2551
15.VII	13	0,5	GW	1	53,00382	143,37661	5378
15.VII	13	2,5	GW	1	52,97706	143,34306	2761
15.VII	13	2	GW	1	52,9558	143,33788	2108
15.VII	13	2	GW	1	52,95542	143,33734	2067
15.VII	15	1,5	GW	1	52,86616	143,34959	1717
15.VII	15	0,5	GW	1	52,85141	143,36304	2367
15.VII	15	1	GW	1	52,85472	143,33937	850
15.VII	15	1	GW	1	52,85432	143,33777	737
16.VII	5	2,5	GW	1	53,31448	143,23119	1538
16.VII	5	4	GW	2	53,26905	143,2913	4297
16.VII	5	8,5	GW	1	53,25213	143,26036	1869
16.VII	15	1	GW	1	52,9068	143,34799	2278
16.VII	15	0,5	GW	1	52,91281	143,36339	3400
16.VII	15	0,5	GW	1	52,91327	143,3625	3348
16.VII	15	2,5	GW	1	52,89209	143,34379	1758
16.VII	15	0,5	GW	1	52,88452	143,38656	4473
16.VII	15	3,5	GW	2	52,88348	143,34266	1541
16.VII	15	2,5	GW	2	52,87985	143,34859	1876
16.VII	15	1,5	GW	1	52,87407	143,35737	2363
20.VII	1	1	GW	1	53,38272	143,21737	3013
21.VII	9	1,5	GW	1	53,13691	143,31858	3388
21.VII	9	2,5	GW	1	53,11275	143,30312	1992
21.VII	9	1,5	GW	1	53,10287	143,30735	2119
21.VII	9	1	GW	1	53,09317	143,30628	1898
21.VII	11	1,5	GW	1	53,07768	143,30855	1953
21.VII	11	2	GW	1	53,04788	143,32483	2600
21.VII	11	1	GW	1	53,041	143,3409	3565
21.VII	11	1	GW	1	53,04041	143,34056	3534
21.VII	11	2,5	GW	1	53,04524	143,31813	2117
21.VII	13	0,5	GW	1	53,02672	143,32168	2063
21.VII	13	0,5	GW	1	53,02603	143,32621	2353
21.VII	13	0,5	GW	1	53,02188	143,34353	3443
21.VII	13	1	GW	1	53,00977	143,33564	2744
21.VII	13	2	GW	1	52,99684	143,33096	2245
21.VII	13	1,5	MW	1	52,99268	143,34844	3345
21.VII	15	1	GW	1	52,91127	143,3315	1258
21.VII	15	1	GW	1	52,90488	143,35209	2520
21.VII	15	1,5	GW	2	52,85906	143,33097	364
25.VII	1	1	UW	1	53,42369	143,23223	5394
25.VII	3	4	KW	2	53,35942	143,22106	2364
25.VII	3	15	MW	1	53,34348	143,20597	899
25.VII	3	1	GW	1	53,28749	143,2568	2367
25.VII	3	1,5	GW	1	53,29483	143,2456	1886
25.VII	3	0,5	GW	1	53,27426	143,27368	3025
25.VII	3	1,5	GW	2	53,29286	143,24077	1516
25.VII	3	1	GW	1	53,2829	143,2451	1477
25.VII	3	1	GW	2	53,28012	143,23568	789
25.VII	5	9,5	GW	2	53,28069	143,24713	1725
25.VII	5	6	GW	1	53,28618	143,25872	2614
25.VII	5	6	GW	1	53,28651	143,25805	2579
25.VII	5	2	GW	1	53,30562	143,29223	5273
25.VII	5	10	GW	1	53,27849	143,24957	1829
25.VII	5	14	GW	1	53,27415	143,2455	1456
25.VII	5	15	GW	1	53,27241	143,24613	1453
25.VII	5	13	GW	1	53,27117	143,25217	1814

21.VII	1	2,5	GW	1	53,43796	143,18017	2624
21.VII	1	2,5	GW	1	53,43473	143,18718	2950
21.VII	1	5	GW	2	53,41159	143,1846	1972
21.VII	1	2,5	GW	1	53,40179	143,20024	2609
21.VII	1	2,5	GW	1	53,40032	143,19924	2494
21.VII	1	1,5	GW	1	53,39017	143,20889	2743
21.VII	3	1	GW	1	53,39364	143,21805	3253
21.VII	5	10	GW	1	53,2674	143,26019	2240
21.VII	5	4	GW	3	53,27368	143,28968	4308
21.VII	5	4,5	GW	2	53,27233	143,28538	3996
21.VII	5	11	GW	1	53,26192	143,25827	1978
21.VII	5	5	GW	1	53,2368	143,26111	1534
21.VII	7	2,5	GW	1	53,15468	143,2911	1806
21.VII	7	1	GW	1	53,13328	143,29573	1676
21.VII	7	1	GW	2	53,13287	143,29438	1579
21.VII	7	1	GW	2	53,13247	143,29301	1481
21.VII	9	1,5	GW	2	53,15281	143,29447	2040
21.VII	9	4,5	GW	1	53,13416	143,29095	1519
21.VII	9	4	GW	2	53,13522	143,29253	1640
25.VII	7	1	GW	2	53,1337	143,29707	1773
25.VII	7	1	GW	1	53,13247	143,29301	1481
25.VII	7	1	GW	1	53,13209	143,29163	1383
25.VII	9	0,5	GW	1	53,17589	143,27116	857
25.VII	9	0,5	GW	1	53,17564	143,27855	1341
25.VII	9	1	GW	1	53,15938	143,29895	2438
25.VII	9	4	GW	2	53,1376	143,28886	1434
25.VII	9	4	GW	1	53,13799	143,28812	1391
25.VII	9	4	GW	1	53,13167	143,296	1814
25.VII	9	4	GW	1	53,13057	143,29671	1844
25.VII	9	1,5	GW	1	53,12952	143,32195	3496
25.VII	9	3,5	GW	1	53,12605	143,30105	2061
25.VII	9	5	GW	1	53,12232	143,29358	1510
25.VII	9	3	GW	1	53,11071	143,29501	1424
25.VII	9	1	GW	1	53,09243	143,30441	1763
25.VII	9	1,5	GW	1	53,0968	143,29333	1098
25.VII	9	1	GW	1	53,08935	143,29447	1058
25.VII	11	1,5	GW	1	53,08108	143,29275	955
25.VII	11	3,5	GW	1	53,06828	143,29509	925
25.VII	11	2,5	GW	1	53,0626	143,31596	2225
25.VII	11	4	GW	1	53,05199	143,31035	1699
25.VII	11	4	GW	2	53,05253	143,31036	1708
25.VII	11	5	GW	1	53,05138	143,30632	1423
25.VII	11	5	GW	1	53,0507	143,30619	1405
25.VII	11	5	GW	1	53,04957	143,30586	1367
25.VII	11	3,5	GW	1	53,04671	143,3113	1686
25.VII	13	0,5	GW	2	53,02798	143,30628	1058
25.VII	13	0,5	GW	1	53,02786	143,30939	1262
25.VII	13	1	GW	1	53,01485	143,30998	1113
25.VII	13	1	GW	1	53,01442	143,31466	1417
25.VII	13	3	GW	1	52,99512	143,31443	1122
25.VII	15	2,5	GW	2	52,86901	143,33896	1058
25.VII	15	2,5	GW	1	52,86881	143,33858	1029
25.VII	15	1,5	GW	2	52,85974	143,33427	594
25.VII	15	1,5	GW	1	52,8599	143,33492	640
26.VII	1	2,5	GW	2	53,44261	143,15778	1380
26.VII	1	2,5	GW	1	53,44248	143,15954	1487
26.VII	1	2,5	GW	2	53,44213	143,16304	1694
26.VII	1	3,5	GW	1	53,42136	143,19091	2713
26.VII	1	4	GW	1	53,40646	143,18875	2051
26.VII	3	3,5	GW	1	53,33046	143,24748	3131
26.VII	3	3,5	GW	1	53,33208	143,24782	3204
26.VII	3	4	GW	1	53,32603	143,2412	2591
26.VII	3	5	GW	1	53,32693	143,23453	2195
26.VII	3	5	GW	1	53,32653	143,23428	2167
25.VII	5	15	GW	1	53,27096	143,24782	1526
25.VII	5	6	GW	1	53,27125	143,27481	3284
25.VII	5	2,5	GW	2	53,21766	143,26501	1307
25.VII	5	4	GW	1	53,22965	143,25888	1210
25.VII	7	0,5	GW	2	53,24672	143,24742	809
25.VII	7	1	GW	2	53,23155	143,26297	1520
25.VII	7	1	GW	2	53,22953	143,28083	2650
25.VII	7	3	GW	2	53,20674	143,27386	1731
25.VII	7	2,5	GW	1	53,20974	143,27688	1990
25.VII	7	5	GW	1	53,19916	143,26689	1121
25.VII	7	5	GW	1	53,19788	143,27186	1420
25.VII	7	5	GW	2	53,18744	143,28772	2248
25.VII	7	5	GW	1	53,18642	143,28836	2270
25.VII	7	7,5	GW	1	53,18561	143,27911	1647
25.VII	7	6	GW	1	53,18586	143,28407	1978
25.VII	7	4	GW	1	53,18267	143,29584	2684
25.VII	7	5	GW	1	53,18151	143,29015	2287
25.VII	7	2,5	MW	2	53,17522	143,30986	3452
25.VII	7	2	GW	1	53,14928	143,29166	1733
26.VII	5	7,5	GW	2	53,28786	143,23712	1256
26.VII	5	7,5	GW	1	53,28775	143,23783	1299
26.VII	5	11	GW	2	53,28013	143,24119	1326
26.VII	5	9,5	GW	1	53,28265	143,24126	1394
26.VII	5	10	GW	1	53,28189	143,2407	1339
26.VII	5	12	GW	2	53,2775	143,246	1572
26.VII	5	13	GW	2	53,27219	143,2512	1777
26.VII	5	8,5	GW	1	53,27322	143,26172	2484
26.VII	5	13	GW	1	53,265	143,25518	1855
26.VII	7	1	GW	1	53,23172	143,2569	1126
26.VII	7	0,5	GW	2	53,24689	143,25329	1197
26.VII	7	0,5	GW	1	53,24574	143,27669	2708
26.VII	7	2	GW	1	53,21632	143,26522	1359
26.VII	7	2,5	GW	1	53,16195	143,30171	2649
26.VII	7	2,5	GW	1	53,16147	143,30119	2605
26.VII	7	2,5	MW	1	53,16054	143,30011	2515
26.VII	7	2,5	GW	2	53,15139	143,28334	1231
26.VII	7	2,5	GW	2	53,15111	143,28252	1171
26.VII	7	2,5	GW	1	53,15083	143,28168	1111
26.VII	7	1,5	GW	3	53,13906	143,28086	818
26.VII	9	1,5	GW	1	53,13691	143,31858	3388
26.VII	9	3	GW	1	53,1215	143,30406	2189
26.VII	9	5	GW	1	53,12062	143,29287	1436
26.VII	9	3,5	GW	1	53,11145	143,29137	1195
26.VII	9	2,5	GW	2	53,10598	143,29253	1188
26.VII	9	2,5	GW	1	53,10575	143,29198	1147
26.VII	9	2,5	GW	1	53,10553	143,29142	1107
26.VII	9	2,5	GW	1	53,10488	143,28969	982
26.VII	11	2,5	GW	2	53,07219	143,29835	1197
26.VII	11	4	GW	1	53,0664	143,29578	943
26.VII	11	5	GW	1	53,06159	143,3002	1166
26.VII	13	8	GW	1	52,97985	143,31712	1079
26.VII	13	1	GW	1	52,93777	143,3321	1462
26.VII	15	2	GW	2	52,90248	143,32076	400
26.VII	15	2,5	GW	2	52,89972	143,32164	413
26.VII	15	1,5	GW	1	52,86078	143,33808	864
27.VII	1	2	GW	1	53,44214	143,18228	2904
27.VII	1	4	GW	1	53,42407	143,1847	2419
27.VII	1	8,5	GW	1	53,41747	143,17216	1397
27.VII	1	1,5	GW	1	53,3847	143,20153	2087
27.VII	1	1	GW	1	53,37648	143,20771	2186
27.VII	1	1	GW	1	53,37591	143,20665	2099
27.VII	3	1	GW	1	53,39493	143,18845	1409
27.VII	3	3,5	GW	1	53,36621	143,19934	1195
27.VII	3	4	GW	1	53,36147	143,2144	2004

26.VII	3	1,5	GW	2	53,30962	143,26805	3783
26.VII	3	3	GW	2	53,30589	143,2258	974
26.VII	3	2	GW	2	53,29745	143,23143	1066
26.VII	3	3	GW	1	53,30472	143,2223	714
26.VII	3	3,5	GW	2	53,30704	143,21824	529
26.VII	3	4	GW	2	53,30919	143,21562	430
26.VII	3	4	GW	2	53,3088	143,21409	320
26.VII	5	2,5	GW	1	53,31445	143,22225	957
26.VII	5	5	GW	1	53,2969	143,22395	628
27.VII	5	7,5	GW	1	53,28695	143,24202	1551
27.VII	5	7,5	GW	1	53,28663	143,24338	1631
27.VII	5	6	GW	1	53,29007	143,24859	2055
27.VII	5	3,5	GW	1	53,29489	143,274	3823
27.VII	5	18	GW	1	53,27164	143,24333	1252
27.VII	5	13	GW	1	53,25615	143,25252	1461
27.VII	5	5	GW	1	53,24073	143,26834	2100
27.VII	7	5	GW	1	53,19865	143,26914	1258
27.VII	7	6	GW	1	53,17563	143,28521	1845
27.VII	7	18	GW	2	53,1737	143,26335	372
27.VII	7	18	GW	1	53,17362	143,26317	359
27.VII	7	1	GW	1	53,1346	143,29972	1964
27.VII	7	1	GW	1	53,13247	143,29301	1481
27.VII	9	1,5	GW	1	53,15605	143,27804	1005
27.VII	9	1	GW	1	53,16293	143,28093	1302
27.VII	9	3	GW	1	53,13807	143,29676	1964
27.VII	9	4	GW	1	53,12944	143,29729	1865
27.VII	9	1,5	GW	2	53,10407	143,30923	2261
27.VII	9	2,5	GW	1	53,1089	143,29816	1605
27.VII	11	1	GW	1	53,08755	143,29564	1241
27.VII	11	0,5	GW	1	53,09898	143,30064	1738
27.VII	11	1	GW	1	53,08648	143,30268	1692
27.VII	11	1,5	GW	2	53,07924	143,30326	1625
31.VII	1	1	GW	1	53,41783	143,23393	5294
31.VII	1	1	GW	1	53,41699	143,23407	5273
31.VII	1	0,5	GW	1	53,35849	143,20783	1558
31.VII	1	0,5	GW	1	53,35737	143,20463	1317
31.VII	3	2	GW	1	53,37236	143,23296	3530
31.VII	3	1	GW	1	53,3785	143,26532	5785
31.VII	3	6,5	GW	1	53,33387	143,22972	2108
31.VII	3	7,5	GW	2	53,33088	143,22543	1740
31.VII	3	7,5	GW	1	53,33181	143,22576	1791
31.VII	3	1	GW	1	53,28342	143,24662	1590
31.VII	3	1,5	GW	2	53,28955	143,23047	756
31.VII	3	1	GW	1	53,28012	143,23568	789
31.VII	5	4	GW	2	53,30202	143,23361	1382
31.VII	5	7,5	GW	1	53,28857	143,22768	662
31.VII	5	5	GW	2	53,26187	143,28312	3588
31.VII	5	6,5	GW	2	53,26116	143,27366	2957
31.VII	5	6	GW	1	53,25949	143,27611	3074
31.VII	5	9,5	GW	1	53,25813	143,26108	2065
31.VII	5	10	GW	2	53,256	143,25846	1842
31.VII	5	10	GW	2	53,25535	143,258	1796
31.VII	5	7,5	GW	1	53,24951	143,26211	1917
31.VII	5	7,5	GW	1	53,24879	143,26128	1844
31.VII	5	11	GW	1	53,25128	143,25083	1229
31.VII	5	4	GW	1	53,23766	143,27556	2492
31.VII	5	2	GW	1	53,21115	143,26665	1251
31.VII	5	2,5	GW	1	53,21727	143,26367	1211
31.VII	7	0,5	GW	1	53,24688	143,25917	1582
31.VII	7	1,5	GW	2	53,22003	143,28133	2491
31.VII	7	1,5	GW	1	53,22054	143,27896	2346
31.VII	7	1,5	GW	2	53,21918	143,28483	2702
31.VII	7	6	GW	2	53,19151	143,27846	1724
1.VIII	5	2	GW	1	53,20811	143,25248	256
27.VII	3	3,5	GW	1	53,36192	143,22258	2539
27.VII	3	1,5	GW	1	53,37254	143,25174	4732
27.VII	3	1,5	GW	1	53,37312	143,25064	4680
27.VII	3	3,5	GW	1	53,35529	143,23571	3166
27.VII	3	1,5	GW	1	53,36886	143,25798	5013
27.VII	3	5	GW	1	53,32774	143,23499	2250
27.VII	3	1,5	GW	1	53,29286	143,24077	1516
27.VII	5	1,5	GW	1	53,32909	143,22084	1232
27.VII	5	1,5	GW	1	53,32805	143,24758	2940
31.VII	7	2	GW	1	53,19249	143,31397	4072
31.VII	7	4	GW	1	53,16321	143,28548	1610
31.VII	7	2,5	GW	1	53,15111	143,28252	1171
31.VII	9	5	GW	1	53,13462	143,28778	1317
31.VII	9	5	GW	1	53,12754	143,29361	1593
31.VII	9	5	GW	1	53,12506	143,294	1580
31.VII	9	2,5	GW	2	53,11986	143,30796	2422
31.VII	9	5	GW	2	53,12062	143,29287	1436
31.VII	9	4	GW	1	53,11792	143,29572	1583
31.VII	11	1	GW	1	53,08793	143,29154	975
31.VII	11	1,5	GW	1	53,08089	143,29441	1062
31.VII	11	1,5	GW	1	53,08099	143,29358	1009
31.VII	11	1,5	GW	1	53,02419	143,29573	326
31.VII	13	3	GW	2	52,99641	143,30253	350
31.VII	13	2,5	GW	1	52,98611	143,33838	2582
31.VII	13	3	GW	1	52,98412	143,33493	2324
31.VII	13	7,5	GW	2	52,96545	143,31332	618
31.VII	13	1	GW	1	52,93608	143,32558	1005
31.VII	15	3,5	GW	2	52,89136	143,33704	1298
31.VII	15	3	GW	1	52,87169	143,33863	1080
1.VIII	1	1	GW	1	53,46033	143,16791	2642
1.VIII	1	4	GW	2	53,43013	143,17561	2061
1.VIII	1	1,5	GW	2	53,44253	143,19764	3883
1.VIII	1	2,5	GW	1	53,43325	143,1897	3056
1.VIII	1	3	GW	1	53,42318	143,19437	2995
1.VIII	1	0,5	GW	1	53,41503	143,25869	6751
1.VIII	1	5	GW	1	53,40961	143,18427	1881
1.VIII	1	0,5	GW	2	53,36221	143,217	2266
1.VIII	1	1	GW	1	53,37045	143,19395	1108
1.VIII	3	1,5	GW	1	53,38285	143,22146	3130
1.VIII	3	2,5	GW	2	53,35558	143,25005	4089
1.VIII	3	2,5	GW	1	53,35502	143,25064	4108
1.VIII	3	2	GW	2	53,34946	143,26434	4805
1.VIII	3	1,5	GW	1	53,35089	143,27556	5565
1.VIII	3	5	GW	2	53,34038	143,23599	2713
1.VIII	3	5	GW	1	53,33996	143,23613	2709
1.VIII	3	5	GW	1	53,34203	143,23528	2720
1.VIII	3	2,5	GW	1	53,32483	143,25756	3596
1.VIII	3	1,5	GW	1	53,31666	143,27386	4376
1.VIII	3	3	GW	1	53,31193	143,23816	1952
1.VIII	3	2	GW	1	53,30529	143,24834	2391
1.VIII	3	1,5	GW	1	53,29152	143,237	1234
1.VIII	5	1	GW	1	53,34111	143,23102	2193
1.VIII	5	2	GW	2	53,32071	143,23336	1834
1.VIII	5	1	GW	1	53,34076	143,24007	2771
1.VIII	5	6	GW	1	53,28682	143,25737	2543
1.VIII	5	13	GW	1	53,26817	143,25417	1868
1.VIII	5	7,5	GW	1	53,24578	143,25702	1493
1.VIII	5	9	GW	1	53,2478	143,25271	1264
1.VIII	5	5	GW	1	53,23452	143,25543	1108
1.VIII	5	4,5	GW	1	53,23211	143,25657	1122
1.VIII	5	1	GW	1	53,19504	143,28875	2281
1.VIII	5	1,5	GW	1	53,20503	143,27758	1806
1.VIII	5	2,5	GW	2	53,21468	143,25257	426
2.VIII	5	15	GW	1	53,26227	143,25125	1532

1.VIII	7	2,5	GW	1	53,20399	143,2921	2872
1.VIII	7	5	GW	1	53,18744	143,28772	2248
1.VIII	7	35	GW	1	53,18023	143,26231	437
1.VIII	7	6	GW	1	53,18032	143,28592	1986
1.VIII	7	7,5	GW	1	53,17888	143,28115	1644
1.VIII	7	2,5	GW	2	53,15006	143,27914	928
1.VIII	7	1,5	GW	2	53,14119	143,28892	1390
1.VIII	7	1,5	GW	1	53,14021	143,28552	1147
1.VIII	9	1	GW	1	53,16348	143,26866	500
1.VIII	9	3	GW	1	53,14562	143,27174	427
1.VIII	9	3	GW	3	53,12185	143,30415	2201
1.VIII	9	4,5	GW	1	53,12104	143,29512	1592
1.VIII	9	5	GW	1	53,11968	143,29231	1385
1.VIII	9	4	GW	2	53,1161	143,29409	1447
1.VIII	9	2,5	GW	1	53,11011	143,29996	1743
1.VIII	9	3	GW	1	53,11019	143,29417	1361
1.VIII	9	3	GW	1	53,11045	143,29459	1393
1.VIII	9	1,5	GW	2	53,09731	143,29495	1213
1.VIII	11	1,5	GW	1	53,08012	143,2993	1376
1.VIII	11	3	GW	1	53,06765	143,30346	1471
1.VIII	11	1	GW	1	53,07784	143,32641	3140
1.VIII	13	1,5	GW	1	53,00492	143,32437	1925
1.VIII	13	3,5	GW	1	52,97514	143,33506	2202
1.VIII	13	10	GW	1	52,96609	143,30715	217
1.VIII	13	10	GW	1	52,96604	143,30691	200
1.VIII	13	1,5	GW	1	52,94171	143,3139	311
1.VIII	15	1	GW	1	52,9107	143,33483	1470
1.VIII	15	0,5	GW	1	52,88523	143,38648	4479
1.VIII	15	2	GW	1	52,86317	143,33142	462
2.VIII	1	5	GW	2	53,41392	143,18455	2050
2.VIII	1	0,5	GW	1	53,35684	143,20301	1197
2.VIII	1	0,5	GW	1	53,35489	143,19638	710
2.VIII	3	1,5	GW	2	53,29589	143,24793	2068
2.VIII	3	2,5	GW	2	53,30519	143,23563	1578
2.VIII	3	2,5	GW	1	53,30324	143,2311	1228
2.VIII	3	2,5	GW	3	53,30288	143,23016	1157
2.VIII	3	2,5	GW	2	53,30219	143,22826	1014
2.VIII	3	1	GW	1	53,28055	143,23728	905
2.VIII	5	7,5	GW	1	53,28775	143,23783	1299
2.VIII	5	10	GW	2	53,28264	143,23741	1144
2.VIII	5	10	GW	1	53,28274	143,23685	1110
2.VIII	5	10	GW	2	53,28203	143,24016	1307
2.VIII	5	13	GW	2	53,27861	143,23937	1170
2.VIII	5	40	GW	1	53,26878	143,23185	436
2.VIII	5	7,5	GW	3	53,28569	143,24669	1822
2.VIII	5	2,5	GW	1	53,29511	143,29419	5137
2.VIII	5	1	GW	1	53,30147	143,34044	8295
2.VIII	5	5	GW	1	53,27777	143,27781	3642
2.VIII	5	6,5	GW	2	53,27493	143,26968	3044
2.VIII	5	7,5	GW	1	53,2688	143,26821	2794
2.VIII	5	2,5	GW	1	53,26906	143,31206	5644
2.VIII	5	3,5	GW	2	53,2688	143,29699	4661
2.VIII	5	6,5	GW	2	53,26214	143,27376	2988
3.VIII	9	0,5	GW	1	53,17531	143,28295	1628
3.VIII	9	1	GW	1	53,15938	143,29895	2438
3.VIII	9	4	GW	1	53,12742	143,298	1881
3.VIII	9	4	GW	1	53,12155	143,29771	1771
3.VIII	9	4,5	GW	1	53,11753	143,29279	1383
3.VIII	9	1,5	GW	1	53,09965	143,30113	1658
3.VIII	11	1	GW	1	53,08146	143,31929	2720
3.VIII	13	1	GW	1	52,93986	143,33828	1903
3.VIII	13	0,5	GW	1	52,92307	143,3286	1017
3.VIII	15	0,5	GW	1	52,84365	143,33966	687
6.VIII	1	3	GW	1	53,39129	143,18083	1018
2.VIII	5	4	GW	1	53,22734	143,25071	622
2.VIII	7	2,5	GW	2	53,21207	143,24986	266
2.VIII	7	2,5	GW	1	53,21201	143,24891	203
2.VIII	7	1	GW	1	53,23167	143,25994	1324
2.VIII	7	1	GW	1	53,23155	143,26297	1520
2.VIII	7	2	GW	1	53,21641	143,26414	1291
2.VIII	7	2,5	GW	1	53,2112	143,26967	1547
2.VIII	7	2,5	GW	1	53,18877	143,30816	3616
2.VIII	7	1,5	GW	1	53,16503	143,32374	4155
2.VIII	7	1,5	GW	1	53,14307	143,29438	1785
2.VIII	9	1,5	GW	1	53,15538	143,28341	1349
2.VIII	9	0,5	GW	1	53,08242	143,31671	2421
2.VIII	11	2,5	GW	1	53,03966	143,31316	1707
2.VIII	13	4	GW	1	52,9858	143,32533	1711
2.VIII	13	2,5	GW	1	52,96357	143,33923	2311
2.VIII	15	2,5	GW	1	52,89873	143,32957	923
2.VIII	15	2,5	GW	2	52,86689	143,334	694
3.VIII	1	0,5	GW	1	53,47236	143,18674	4251
3.VIII	1	2,5	GW	1	53,43737	143,18165	2696
3.VIII	1	5	GW	3	53,4215	143,18083	2084
3.VIII	1	1,5	GW	1	53,42311	143,21784	4468
3.VIII	1	1,5	GW	1	53,40433	143,21883	3868
3.VIII	1	2,5	GW	2	53,40481	143,20186	2817
3.VIII	1	4	GW	1	53,39948	143,18312	1451
3.VIII	3	1,5	GW	2	53,38456	143,18243	698
3.VIII	3	2	GW	1	53,37797	143,18552	686
3.VIII	3	1	GW	1	53,3951	143,19721	1971
3.VIII	3	1	GW	1	53,29609	143,27207	3612
3.VIII	3	1	GW	1	53,2953	143,27092	3513
3.VIII	3	1	GW	1	53,29453	143,26974	3414
3.VIII	3	1	GW	1	53,28879	143,25955	2584
3.VIII	3	0,5	GW	1	53,26485	143,2467	1008
3.VIII	5	8,5	GW	2	53,2773	143,25757	2317
3.VIII	5	10	GW	1	53,27361	143,25624	2139
3.VIII	5	11	GW	2	53,27201	143,2549	2012
3.VIII	5	3,5	GW	2	53,27806	143,29319	4646
3.VIII	5	9	GW	1	53,25716	143,26219	2113
3.VIII	5	5	GW	1	53,24438	143,27322	2508
3.VIII	5	7,5	GW	1	53,24774	143,25995	1732
3.VIII	5	7,5	GW	2	53,24517	143,25597	1410
3.VIII	5	4	GW	1	53,23069	143,2618	1425
3.VIII	7	4	GW	2	53,20275	143,26743	1229
3.VIII	7	2	GW	1	53,21499	143,27468	1953
3.VIII	7	5	GW	1	53,19916	143,26689	1121
3.VIII	7	1,5	GW	1	53,21947	143,28367	2633
3.VIII	7	2,5	GW	1	53,20399	143,2921	2872
3.VIII	7	2,5	GW	1	53,19754	143,3014	3350
3.VIII	7	1,5	GW	1	53,1439	143,29648	1940
3.VIII	7	0,5	GW	1	53,12149	143,3125	2536
3.VIII	7	1	GW	2	53,13287	143,29438	1579
3.VIII	7	0,5	GW	1	53,11875	143,30384	1913
3.VIII	7	2,5	GW	1	53,14824	143,27114	367
3.VIII	7	0,5	GW	1	53,11647	143,2948	1274
7.VIII	1	15	GW	3	53,41606	143,16433	855
7.VIII	3	2	GW	2	53,37785	143,18428	603
7.VIII	3	9	GW	2	53,3501	143,20396	980
7.VIII	3	1,5	GW	2	53,297	143,25019	2247
7.VIII	3	1,5	GW	1	53,29334	143,242	1609
7.VIII	3	1,5	GW	2	53,29152	143,237	1234
7.VIII	3	4,5	GW	1	53,31178	143,21619	549
7.VIII	5	19	GW	1	53,27469	143,23317	670
7.VIII	5	15	GW	2	53,2739	143,24386	1344
7.VIII	5	16	GW	1	53,27266	143,24409	1327
7.VIII	5	15	GW	1	53,27241	143,24613	1453

6.VIII	3	2,5	GW	1	53,35028	143,25473	4219
6.VIII	3	5	GW	1	53,31344	143,21476	510
6.VIII	3	1	GW	2	53,27933	143,23244	558
6.VIII	3	10	GW	1	53,32185	143,20513	162
6.VIII	5	4,5	GW	1	53,29935	143,22476	742
6.VIII	5	2,5	GW	1	53,31407	143,23861	2009
6.VIII	5	2,5	GW	1	53,31308	143,2474	2553
6.VIII	5	5	GW	2	53,28035	143,27553	3558
6.VIII	5	20	GW	1	53,26862	143,24393	1216
6.VIII	5	4	GW	2	53,28123	143,28476	4178
6.VIII	5	5	GW	1	53,26538	143,28309	3674
6.VIII	5	5	GW	1	53,26596	143,28303	3684
6.VIII	5	20	GW	1	53,26312	143,24602	1214
6.VIII	5	6	GW	1	53,26052	143,27632	3113
6.VIII	5	10	GW	3	53,25503	143,25776	1773
6.VIII	5	9	GW	1	53,25261	143,25893	1788
6.VIII	5	10	GW	1	53,2517	143,25452	1479
6.VIII	7	5	GW	2	53,20019	143,25326	248
6.VIII	7	1,5	GW	2	53,2228	143,25798	1016
6.VIII	7	2	GW	2	53,2161	143,26735	1494
6.VIII	7	2	GW	2	53,21361	143,28075	2323
6.VIII	7	1,5	GW	2	53,18584	143,3272	4804
6.VIII	7	5	GW	2	53,17719	143,29006	2194
6.VIII	7	1	GW	2	53,13173	143,29024	1285
6.VIII	7	1	GW	1	53,13137	143,28884	1186
6.VIII	9	2,5	GW	2	53,14645	143,28509	1322
6.VIII	9	5	GW	1	53,12015	143,2926	1411
6.VIII	9	5	GW	1	53,11992	143,29246	1398
6.VIII	9	4	GW	2	53,11441	143,29211	1290
6.VIII	11	2,5	GW	2	53,07305	143,29424	938
6.VIII	13	5	GW	2	52,98581	143,31905	1293
6.VIII	13	2	GW	1	52,98911	143,34243	2894
6.VIII	13	5	GW	1	52,9618	143,31682	797
6.VIII	13	2,5	GW	4	52,95121	143,31706	659
6.VIII	15	2,5	GW	1	52,87894	143,34835	1844
6.VIII	15	1,5	GW	3	52,87814	143,35914	2547
6.VIII	15	1,5	GW	2	52,87772	143,35901	2532
6.VIII	15	4	GW	1	52,87261	143,33323	737
6.VIII	15	4	GW	1	52,8722	143,33238	674
6.VIII	15	2,5	GW	2	52,86584	143,33033	433
6.VIII	15	4	GW	1	52,87034	143,32665	262
6.VIII	15	2,5	GW	1	52,86553	143,3289	332
6.VIII	15	1,5	GW	1	52,86006	143,33556	685
13.VIII	3	3,5	GW	1	53,36587	143,18756	434
13.VIII	3	1,5	GW	1	53,3847	143,18388	794
13.VIII	3	7,5	GW	1	53,35298	143,19056	217
13.VIII	3	1	GW	1	53,39498	143,20246	2302
13.VIII	3	1,5	GW	1	53,38358	143,21725	2884
13.VIII	3	2	GW	1	53,37752	143,21067	2273
13.VIII	3	2	GW	1	53,37311	143,23076	3414
13.VIII	5	11	GW	2	53,27717	143,24833	1715
13.VIII	5	50	GW	1	53,26263	143,23521	501
13.VIII	7	2,5	GW	1	53,21227	143,25651	706
13.VIII	7	8	GW	1	53,18773	143,27572	1468
13.VIII	7	20	GW	1	53,18605	143,25361	-16
13.VIII	9	0,5	GW	1	53,17195	143,30286	2892
13.VIII	9	2	GW	1	53,14611	143,29733	2126
13.VIII	9	1,5	GW	1	53,15113	143,29918	2326
13.VIII	9	1,5	GW	1	53,14446	143,31123	3019
13.VIII	9	5,5	GW	1	53,12644	143,29218	1481
13.VIII	9	5,5	GW	1	53,11984	143,2906	1274
13.VIII	9	1	GW	1	53,08961	143,2955	1130
13.VIII	9	1	GW	1	53,08989	143,29653	1202
13.VIII	9	0,5	GW	1	53,07787	143,30232	1399
7.VIII	5	10	GW	2	53,27174	143,25786	2197
7.VIII	5	10	GW	1	53,2691	143,25949	2237
7.VIII	5	19	GW	3	53,26576	143,24651	1312
7.VIII	5	4	GW	1	53,2677	143,29158	4282
7.VIII	5	7,5	GW	1	53,25922	143,26857	2578
7.VIII	5	10	GW	1	53,24722	143,2471	886
7.VIII	5	15	KW	2	53,25123	143,24008	531
7.VIII	5	1,5	GW	1	53,20307	143,27065	1308
7.VIII	7	1	GW	1	53,23172	143,25538	1027
7.VIII	7	1	GW	1	53,23167	143,25994	1324
7.VIII	7	1,5	GW	1	53,22277	143,25924	1098
7.VIII	7	0,5	GW	1	53,2444	143,28623	3306
7.VIII	7	1	GW	1	53,22488	143,29893	3743
7.VIII	7	1,5	GW	1	53,21425	143,29894	3528
7.VIII	7	6	GW	1	53,18314	143,28536	2007
7.VIII	7	6	GW	1	53,18001	143,28594	1981
7.VIII	7	6	GW	1	53,17844	143,28588	1946
7.VIII	7	1	GW	1	53,17172	143,34182	5476
7.VIII	9	1	GW	1	53,16293	143,28093	1302
7.VIII	9	10	GW	1	53,13292	143,27335	336
7.VIII	9	1,5	GW	1	53,14084	143,31534	3235
7.VIII	9	30	DW	1	53,12646	143,27451	313
7.VIII	13	0,5	GW	1	53,01565	143,35904	4383
7.VIII	13	1	GW	1	52,93912	143,33626	1758
7.VIII	15	1	GW	1	52,90033	143,3592	2917
7.VIII	15	1,5	GW	2	52,89647	143,35195	2372
7.VIII	15	2	GW	1	52,89449	143,3465	1978
7.VIII	15	1,5	GW	1	52,88937	143,3579	2650
7.VIII	15	1,5	GW	1	52,88897	143,3581	2657
7.VIII	15	1	GW	1	52,85748	143,3477	1449
7.VIII	15	1,5	GW	2	52,90354	143,33833	1584
7.VIII	15	1,5	GW	1	52,90293	143,34015	1695
7.VIII	15	1,5	GW	1	52,89508	143,35353	2454
7.VIII	15	1,5	GW	1	52,89647	143,35195	2372
7.VIII	15	1,5	GW	1	52,88317	143,35968	2666
7.VIII	15	2,5	GW	1	52,86563	143,32938	366
13.VIII	1	5	GW	1	53,43104	143,15975	1096
13.VIII	1	1	GW	1	53,44827	143,20813	4746
13.VIII	1	1	GW	1	53,44062	143,21941	5185
13.VIII	1	2,5	GW	1	53,41894	143,20235	3347
13.VIII	1	2	GW	1	53,41387	143,21055	3684
13.VIII	1	2,5	GW	3	53,3881	143,1828	1029
13.VIII	3	3,5	GW	1	53,36578	143,18666	374
16.VIII	3	5	GW	1	53,31988	143,22794	1552
16.VIII	3	18	GW	2	53,32846	143,20586	417
16.VIII	3	2,5	GW	1	53,30604	143,23736	1715
16.VIII	3	13	GW	1	53,32474	143,20578	295
16.VIII	3	0,5	GW	1	53,26336	143,24047	564
16.VIII	5	5	GW	2	53,296	143,24044	1675
16.VIII	5	1,5	GW	1	53,32318	143,2731	4472
16.VIII	5	6	GW	1	53,28831	143,25385	2352
16.VIII	5	2,5	GW	2	53,26906	143,31206	5644
16.VIII	5	2,5	MW	2	53,26994	143,31188	5654
16.VIII	5	2,5	GW	1	53,26817	143,31221	5631
16.VIII	5	2	GW	2	53,25875	143,32278	6081
16.VIII	5	1,5	GW	1	53,25692	143,33654	6927
16.VIII	5	1,5	GW	1	53,25124	143,33518	6697
16.VIII	5	2,5	GW	1	53,24963	143,30939	4984
16.VIII	7	1,5	GW	1	53,22207	143,26923	1739
16.VIII	7	1	GW	1	53,22442	143,30024	3819
16.VIII	7	0,5	GW	1	53,24025	143,30454	4422
16.VIII	7	2,5	GW	1	53,1583	143,29717	2277
16.VIII	7	2,5	GW	2	53,15506	143,29182	1861
16.VIII	7	7,5	GW	1	53,16663	143,269	600

13.VIII	11	3	GW	1	53,07019	143,29576	997
13.VIII	11	3	GW	1	53,06924	143,29927	1216
13.VIII	11	2,5	GW	1	53,05987	143,318	2321
13.VIII	11	2,5	GW	1	53,05917	143,31841	2338
13.VIII	11	1	GW	1	53,05699	143,34355	3973
13.VIII	11	1,5	GW	1	53,05412	143,33285	3222
13.VIII	11	2,5	GW	2	53,04958	143,31989	2297
13.VIII	11	2,5	GW	2	53,04921	143,3198	2286
13.VIII	11	2,5	GW	2	53,04884	143,3197	2274
13.VIII	11	2,5	GW	1	53,04185	143,31554	1896
13.VIII	11	1	GW	1	53,02823	143,32828	2543
13.VIII	13	0,5	GW	1	53,02792	143,30783	1160
13.VIII	13	1	GW	1	53,01477	143,31116	1190
13.VIII	13	0,5	GW	1	53,02727	143,3171	1766
13.VIII	13	0,5	GW	1	53,02312	143,33934	3183
13.VIII	15	5	GW	1	52,88605	143,33611	1149
15.VIII	3	1	GW	1	53,39086	143,23309	4123
15.VIII	3	2,5	GW	3	53,36539	143,2351	3446
15.VIII	3	4	GW	1	53,31249	143,22491	1126
15.VIII	3	5	GW	1	53,31572	143,22079	966
15.VIII	3	5	GW	1	53,31598	143,22136	1010
15.VIII	5	3	GW	2	53,30953	143,2308	1389
15.VIII	5	3	GW	1	53,30878	143,24149	2063
15.VIII	5	2,5	GW	1	53,30644	143,27331	4067
15.VIII	5	40	GW	1	53,26862	143,23231	462
15.VIII	5	40	GW	1	53,26862	143,23231	462
15.VIII	5	3	GW	1	53,22322	143,26491	1440
15.VIII	5	1,5	GW	1	53,20353	143,2724	1433
16.VIII	1	1,5	GW	1	53,44432	143,19401	3719
16.VIII	1	1,5	GW	1	53,4141	143,22018	4297
16.VIII	1	1,5	GW	1	53,4169	143,21982	4374
16.VIII	3	1,5	GW	1	53,38285	143,22146	3130
16.VIII	3	1	GW	1	53,30731	143,28485	4780
17.VIII	3	5	GW	1	53,32196	143,23044	1777
17.VIII	3	5	GW	1	53,32232	143,23082	1813
17.VIII	3	3	GW	1	53,30283	143,21495	186
17.VIII	5	15	GW	1	53,27788	143,22578	271
17.VIII	5	10	GW	1	53,2831	143,23457	972
17.VIII	5	5	GW	1	53,28847	143,26443	3042
17.VIII	5	4,5	GW	1	53,28986	143,26791	3302
17.VIII	5	1,5	GW	3	53,23088	143,32265	5375
17.VIII	5	1,5	MW	1	53,22234	143,31295	4533
17.VIII	5	1,5	GW	1	53,20788	143,2859	2417
17.VIII	5	5	GW	1	53,23482	143,25627	1170
17.VIII	7	1	GW	1	53,22978	143,27938	2560
17.VIII	7	2,5	GW	5	53,20613	143,28765	2623
17.VIII	7	5	GW	1	53,19063	143,28496	2133
17.VIII	7	1	GW	2	53,19853	143,33687	5696
17.VIII	7	7,5	GW	1	53,17626	143,28056	1552
17.VIII	7	8	GW	1	53,1757	143,27901	1440
17.VIII	7	4,5	GW	1	53,16038	143,27458	839
17.VIII	9	1,5	GW	1	53,15586	143,27984	1121
17.VIII	9	1	GW	1	53,16304	143,27983	1231
17.VIII	9	2,5	GW	1	53,14152	143,2974	2060
17.VIII	9	2,5	MW	1	53,12226	143,30864	2504
17.VIII	11	2,5	GW	1	53,07233	143,29777	1161
17.VIII	11	4	MW	1	53,04826	143,3094	1582
17.VIII	13	1	GW	1	53,01485	143,30998	1113
17.VIII	13	3	HP	1	52,9927	143,32241	1617
17.VIII	13	7,5	HP	1	52,98318	143,31343	882
17.VIII	13	2,5	MW	1	52,97792	143,34288	2762
17.VIII	13	2,5	MW	1	52,97404	143,34331	2734
17.VIII	13	2	MW	1	52,96475	143,34654	2814
17.VIII	13	2,5	GW	1	52,95433	143,32649	1331

16.VIII	9	1	GW	1	53,16348	143,26978	574
16.VIII	9	2	GW	1	53,15113	143,27914	1001
16.VIII	9	1,5	GW	1	53,15475	143,28691	1571
16.VIII	9	0,5	GW	4	53,07723	143,29956	1207
16.VIII	11	0,5	GW	1	53,09942	143,29657	1475
16.VIII	11	4	MW	1	53,05882	143,30808	1648
16.VIII	11	2,5	MW	1	53,05554	143,31984	2380
16.VIII	11	1	MW	1	53,04521	143,3428	3752
16.VIII	11	2	GW	1	53,04416	143,32315	2434
16.VIII	11	2,5	GW	3	53,03589	143,30716	1254
16.VIII	11	2,5	GW	1	53,03589	143,30716	1254
16.VIII	13	1,5	GW	1	53,00679	143,31522	1344
16.VIII	13	1,5	GW	1	53,00665	143,31615	1404
16.VIII	13	1,5	GW	1	53,00649	143,31709	1464
16.VIII	13	1,5	GW	1	53,00633	143,31802	1523
16.VIII	13	1,5	GW	1	53,00558	143,32168	1756
16.VIII	13	4	MW	1	52,97349	143,3321	1981
16.VIII	13	2,5	GW	1	52,95433	143,32649	1331
16.VIII	13	2,5	GW	1	52,95459	143,32707	1373
16.VIII	13	1	GW	1	52,93448	143,31651	380
16.VIII	15	1	GW	1	52,91209	143,3221	646
16.VIII	15	10	GW	1	52,87817	143,327	414
16.VIII	15	2	GW	1	52,86818	143,34407	1383
16.VIII	15	1	GW	1	52,85809	143,34911	1552
16.VIII	15	1,5	GW	2	52,86041	143,33683	775
17.VIII	1	2,5	GW	1	53,44213	143,16304	1694
17.VIII	1	1,5	GW	1	53,37776	143,18679	915
17.VIII	1	0,5	GW	2	53,35684	143,20301	1197
17.VIII	1	0,5	GW	1	53,35737	143,20463	1317
17.VIII	3	4	GW	1	53,36233	143,21049	1782
17.VIII	3	3,5	GW	1	53,35978	143,22784	2807
17.VIII	3	2,5	GW	1	53,3387	143,25968	4168
17.VIII	3	4	GW	1	53,32603	143,2412	2591
18.VIII	5	8,5	GW	1	53,28268	143,24781	1820
18.VIII	5	13	GW	1	53,27694	143,24398	1427
18.VIII	5	2,5	GW	1	53,28117	143,30727	5636
18.VIII	5	10	GW	1	53,25347	143,25642	1647
18.VIII	5	10	GW	2	53,25378	143,25671	1673
18.VIII	5	10	GW	2	53,24979	143,25192	1263
18.VIII	5	6	GW	4	53,24059	143,25845	1456
21.VIII	1	0,5	GW	1	53,35737	143,20463	1317
22.VIII	3	1,5	GW	1	53,37477	143,24724	4516
22.VIII	3	4	GW	2	53,33234	143,24348	2936
22.VIII	3	5	GW	2	53,32693	143,23453	2195
22.VIII	3	5	GW	1	53,32613	143,23403	2137
22.VIII	3	3,5	GW	1	53,31407	143,23427	1772
22.VIII	3	1,5	GW	2	53,29644	143,24907	2158
22.VIII	3	0,5	GW	1	53,27592	143,2772	3301
22.VIII	3	0,5	GW	1	53,27677	143,27891	3437
22.VIII	3	1	GW	1	53,28687	143,2554	2258
22.VIII	3	2,5	GW	1	53,30324	143,2311	1228
22.VIII	3	1	GW	1	53,28626	143,25398	2149
22.VIII	3	1	GW	1	53,28342	143,24662	1590
22.VIII	3	1,5	GW	1	53,29069	143,23442	1043
22.VIII	3	1	GW	3	53,27861	143,22915	326
22.VIII	5	4	GW	2	53,30221	143,22796	1021
22.VIII	5	7,5	GW	1	53,28796	143,2364	1212
22.VIII	5	1	GW	1	53,33224	143,28755	5636
22.VIII	5	14	GW	1	53,27573	143,24247	1299
22.VIII	5	9	GW	1	53,27175	143,261	2401
22.VIII	5	7,5	GW	1	53,27134	143,26705	2783
22.VIII	5	19	GW	1	53,26454	143,24681	1301
22.VIII	5	20	GW	1	53,26371	143,24602	1229
22.VIII	5	3,5	GW	2	53,24788	143,29258	3851

17.VIII	13	2,5	GW	1	52,95335	143,32411	1159
17.VIII	15	1	GW	1	52,91127	143,3315	1258
17.VIII	15	1,5	GW	1	52,90529	143,33124	1142
17.VIII	15	2	GW	2	52,90118	143,33164	1101
17.VIII	15	8,5	HP	1	52,88783	143,32622	521
17.VIII	15	20	HP	1	52,8834	143,32463	343
17.VIII	15	3	GW	1	52,88282	143,34542	1714
17.VIII	15	5	GW	1	52,88023	143,337	1112
17.VIII	15	3	GW	2	52,8723	143,33952	1149
17.VIII	15	3,5	GW	1	52,87244	143,33611	925
17.VIII	15	2,5	GW	4	52,86646	143,33265	597
18.VIII	3	2,5	GW	1	53,34966	143,25517	4228
18.VIII	3	10	GW	1	53,33474	143,22007	1521
18.VIII	3	7,5	GW	2	53,334	143,22623	1889
18.VIII	3	10	GW	1	53,33449	143,22006	1512
18.VIII	3	13	GW	2	53,33254	143,21551	1161
18.VIII	3	15	GW	1	53,3324	143,21247	963
18.VIII	3	2,5	GW	1	53,30561	143,2365	1647
18.VIII	3	1	GW	2	53,28099	143,23887	1020
18.VIII	3	0,5	GW	4	53,26485	143,2467	1008
18.VIII	5	2	GW	1	53,32023	143,21332	523
18.VIII	5	3	GW	1	53,30845	143,24412	2225
18.VIII	5	6	GW	1	53,28831	143,25385	2352
22.VIII	7	1,5	GW	1	53,20205	143,31746	4495
22.VIII	7	6,5	GW	1	53,18765	143,28078	1798
22.VIII	7	2	MW	1	53,19489	143,31233	4013
22.VIII	7	7,5	GW	1	53,18536	143,27928	1653
22.VIII	7	2,5	GW	1	53,17466	143,30973	3432
22.VIII	7	1,5	GW	3	53,15625	143,31653	3505
22.VIII	7	1,5	GW	1	53,15562	143,31584	3447
22.VIII	7	7,5	GW	1	53,17053	143,27615	1148
22.VIII	7	6,5	GW	1	53,16876	143,27763	1209
22.VIII	7	2	GW	1	53,15441	143,30139	2475
22.VIII	7	4	GW	1	53,15812	143,27434	777
22.VIII	9	1,5	GW	2	53,15626	143,27532	828
22.VIII	9	1,5	GW	1	53,15635	143,2735	709
22.VIII	9	2,5	GW	1	53,14821	143,27262	525
22.VIII	9	2,5	GW	1	53,14821	143,27262	525
22.VIII	9	1	GW	1	53,1605	143,29488	2187
22.VIII	9	1	GW	1	53,15738	143,30479	2793
22.VIII	9	1,5	GW	1	53,14732	143,30696	2781
22.VIII	9	1	GW	1	53,14441	143,32552	3963
22.VIII	9	1	GW	1	53,14498	143,32495	3934
22.VIII	9	2,5	GW	1	53,13637	143,30395	2412
22.VIII	9	0,5	GW	1	53,08242	143,31671	2421
22.VIII	11	0,5	GW	1	53,09841	143,30467	1997
22.VIII	11	7	MW	1	53,05145	143,30121	1086
22.VIII	11	2,5	GW	1	53,04385	143,31721	2036
22.VIII	11	30	HP	2	53,04996	143,28648	88
22.VIII	13	1	GW	1	52,9366	143,32779	1159
22.VIII	15	10	GW	2	52,88798	143,32209	250
22.VIII	15	1	GW	1	52,91114	143,33234	1311
22.VIII	15	1	GW	1	52,90845	143,34357	2012
22.VIII	15	2	GW	2	52,89965	143,33692	1426
22.VIII	15	2,5	GW	1	52,8959	143,33795	1433
22.VIII	15	2,5	GW	2	52,89609	143,33755	1410
22.VIII	15	1,5	GW	1	52,86381	143,3456	1413
22.VIII	15	1,5	GW	1	52,86381	143,3456	1413
22.VIII	15	1,5	GW	2	52,86097	143,3387	908
22.VIII	15	1	GW	2	52,85561	143,3425	1073
22.VIII	15	1,5	GW	1	52,85931	143,3323	456
23.VIII	13	2,5	GW	1	52,99725	143,31799	1389
25.VIII	5	10	GW	1	53,28264	143,23741	1144
27.VIII	1	2	MW	1	53,40143	143,20754	3056
22.VIII	5	3,5	GW	1	53,2472	143,29211	3804
22.VIII	5	1,5	GW	2	53,22793	143,31967	5108
22.VIII	5	1,5	GW	1	53,2289	143,32069	5198
22.VIII	5	2,5	GW	1	53,23221	143,29474	3599
22.VIII	5	10	GW	1	53,24764	143,24804	957
22.VIII	5	3,5	GW	1	53,2271	143,26269	1393
22.VIII	5	3,5	GW	2	53,22826	143,26582	1625
22.VIII	5	1	GW	1	53,19927	143,30037	3139
22.VIII	5	1	GW	1	53,1957	143,29074	2426
22.VIII	5	3,5	GW	1	53,22909	143,26785	1777
22.VIII	5	2,5	GW	1	53,21806	143,26634	1404
22.VIII	5	2,5	GW	2	53,21689	143,26231	1113
22.VIII	5	2	GW	2	53,21036	143,26357	1031
22.VIII	5	1,5	GW	1	53,2022	143,2671	1056
22.VIII	5	2,5	GW	1	53,21554	143,2568	722
22.VIII	7	1,5	GW	3	53,2227	143,25043	519
22.VIII	7	2,5	GW	1	53,21224	143,25365	518
22.VIII	7	5	GW	1	53,19948	143,26516	1014
22.VIII	7	4	GW	1	53,20038	143,27643	1771
22.VIII	7	6,5	GW	3	53,19208	143,27505	1512
22.VIII	7	6,5	GW	1	53,19247	143,27431	1472
22.VIII	7	6	GW	1	53,19053	143,27979	1791
22.VIII	7	1,5	GW	2	53,2027	143,3168	4464
27.VIII	5	1,5	GW	1	53,20353	143,2724	1433
27.VIII	7	0,5	GW	1	53,2447	143,28434	3188
27.VIII	7	3	GW	1	53,19888	143,29246	2791
27.VIII	7	5	GW	1	53,18043	143,29027	2273
27.VIII	7	2,5	GW	2	53,17297	143,30922	3365
27.VIII	7	2,5	GW	1	53,17242	143,30902	3340
27.VIII	7	4	GW	1	53,17225	143,29426	2369
27.VIII	7	7,5	GW	1	53,17208	143,27785	1290
27.VIII	7	10	GW	1	53,17275	143,27234	943
27.VIII	7	5	GW	1	53,16726	143,28346	1561
27.VIII	7	20	HP	1	53,17557	143,26453	488
27.VIII	7	5	GW	1	53,16614	143,28196	1439
27.VIII	7	13	GW	2	53,17259	143,26766	632
27.VIII	9	1	GW	1	53,16344	143,27314	795
27.VIII	9	1	GW	1	53,16269	143,28313	1444
27.VIII	9	1	GW	2	53,16205	143,28748	1722
27.VIII	9	1	GW	1	53,16186	143,28856	1790
27.VIII	9	1	GW	1	53,161	143,2928	2057
27.VIII	9	2	GW	1	53,14979	143,28657	1472
27.VIII	9	0,5	GW	3	53,16684	143,31842	3841
27.VIII	9	0,5	GW	1	53,1658	143,32083	3984
27.VIII	9	10	HP	1	53,13004	143,28081	785
27.VIII	9	0,5	GW	1	53,14593	143,34745	5436
27.VIII	9	0,5	GW	1	53,11904	143,35439	5479
27.VIII	9	0,5	GW	1	53,10615	143,34896	4920
27.VIII	9	1,5	GW	1	53,10101	143,304	1868
27.VIII	9	1	GW	1	53,08887	143,29238	912
27.VIII	11	2,5	GW	1	53,07374	143,28815	544
27.VIII	11	14	HP	3	53,05772	143,28741	262
27.VIII	11	6	GW	2	53,04366	143,29657	665
27.VIII	13	1,5	GW	1	53,00245	143,33204	2398
27.VIII	13	3,5	GW	1	52,98376	143,33115	2067
27.VIII	15	1	GW	1	52,85872	143,35049	1654
28.VIII	1	2	GW	2	53,41568	143,21035	3735
28.VIII	1	4	GW	1	53,41028	143,18996	2262
28.VIII	1	8	GW	1	53,40404	143,16983	776
28.VIII	1	1	GW	1	53,36847	143,18765	641
28.VIII	1	1	GW	1	53,36884	143,18893	735
28.VIII	3	1	GW	1	53,39504	143,20071	2193
28.VIII	3	2,5	GW	1	53,35028	143,25473	4219
28.VIII	3	18	GW	1	53,33506	143,21095	950

27.VIII	1	0,5	GW	1	53,37651	143,23992	4212
27.VIII	1	0,5	GW	1	53,37561	143,23885	4113
27.VIII	3	18	GW	1	53,33913	143,2094	980
27.VIII	3	35	GW	1	53,33666	143,20354	529
27.VIII	3	5	GW	1	53,34079	143,23583	2716
27.VIII	3	1	GW	1	53,3313	143,29614	6257
27.VIII	3	0,5	GW	1	53,3289	143,32377	7941
27.VIII	3	2,5	GW	1	53,31982	143,25456	3246
27.VIII	5	1	GW	1	53,33094	143,29153	5861
27.VIII	5	1,5	GW	1	53,31684	143,29131	5494
27.VIII	5	4	UW	1	53,29493	143,26499	3239
27.VIII	5	1	GW	1	53,20508	143,3129	4097
27.VIII	5	0,5	GW	1	53,17472	143,29415	2122
28.VIII	5	4	GW	1	53,29921	143,25218	2516
28.VIII	5	4	GW	2	53,29867	143,25425	2637
28.VIII	5	15	GW	1	53,27561	143,24022	1151
28.VIII	5	13	GW	2	53,27477	143,24797	1632
28.VIII	5	65	HP	1	53,26367	143,23352	417
28.VIII	5	65	HP	1	53,26301	143,23349	398
28.VIII	5	65	HP	1	53,26261	143,23337	381
28.VIII	5	13	GW	1	53,25204	143,24784	1055
28.VIII	5	5	GW	2	53,23513	143,2571	1232
28.VIII	5	1,5	GW	1	53,20353	143,2724	1433
28.VIII	5	1,5	GW	3	53,20179	143,2653	929
28.VIII	7	1,5	GW	1	53,2227	143,25043	519
28.VIII	7	1	GW	1	53,23164	143,25083	727
28.VIII	7	5	GW	1	53,20025	143,25626	446
28.VIII	7	10	GW	2	53,19138	143,25991	505
28.VIII	7	1,5	GW	1	53,22243	143,2655	1502
28.VIII	7	1,5	GW	2	53,22192	143,27046	1817
28.VIII	7	1,5	GW	2	53,21947	143,28367	2633
28.VIII	7	15	GW	2	53,18427	143,2677	872
28.VIII	7	6	GW	2	53,18556	143,28425	1983
28.VIII	7	5	GW	1	53,18258	143,28993	2295
28.VIII	7	5	GW	1	53,18222	143,29001	2293
28.VIII	9	1	GW	2	53,16348	143,2709	648
28.VIII	9	1	GW	1	53,16348	143,26978	574
28.VIII	9	1	GW	1	53,16329	143,27649	1014
28.VIII	9	3	GW	1	53,13078	143,30316	2274
28.VIII	11	0,5	GW	2	53,09995	143,28696	845
28.VIII	11	3,5	GW	1	53,0613	143,30883	1734
28.VIII	11	1	GW	2	53,021	143,31278	1411
28.VIII	11	1,5	GW	1	53,02688	143,30752	1147
28.VIII	13	2	GW	1	53,00264	143,30677	722
28.VIII	13	4	GW	1	52,99138	143,31221	920
29.VIII	1	33	HP	1	53,41608	143,15502	270
29.VIII	1	2	GW	1	53,44302	143,17963	2769
29.VIII	1	35	HP	1	53,41424	143,15798	391
29.VIII	1	4	GW	1	53,40571	143,18837	2001
29.VIII	3	1,5	GW	1	53,3852	143,19847	1739
29.VIII	3	2,5	GW	2	53,36899	143,22572	2962
29.VIII	3	3,5	GW	1	53,36043	143,22638	2734
29.VIII	3	6,5	GW	1	53,34849	143,22138	2039
29.VIII	3	6	GW	2	53,3463	143,22664	2305
29.VIII	3	30	GW	1	53,3368	143,20475	610
29.VIII	3	15	GW	1	53,33752	143,21265	1136
29.VIII	3	5	GW	2	53,31546	143,22022	921
29.VIII	5	4	GW	1	53,30205	143,22118	578
29.VIII	5	1,5	GW	1	53,3288	143,21511	853
29.VIII	5	2,5	GW	1	53,31449	143,22374	1055
29.VIII	5	4,5	GW	1	53,29931	143,23105	1149
29.VIII	7	13	GW	2	53,18947	143,25807	346
29.VIII	7	6,5	GW	1	53,19594	143,2635	834
29.VIII	7	3,5	GW	2	53,17112	143,29763	2567
28.VIII	3	3	GW	3	53,33117	143,25298	3504
28.VIII	3	10	GW	1	53,33275	143,21974	1437
28.VIII	3	1,5	GW	1	53,30387	143,2614	3178
28.VIII	3	4	GW	1	53,31409	143,22811	1380
28.VIII	3	1,5	GW	1	53,29996	143,25556	2682
28.VIII	3	1,5	GW	1	53,29535	143,24677	1977
28.VIII	3	1,5	GW	1	53,29483	143,2456	1886
28.VIII	3	1,5	GW	1	53,29334	143,242	1609
28.VIII	5	2,5	GW	2	53,314	143,21484	466
28.VIII	5	7,5	GW	1	53,28852	143,22988	803
28.VIII	5	2,5	GW	1	53,31436	143,23417	1728
28.VIII	5	8,5	GW	2	53,28545	143,23751	1221
28.VIII	5	3	GW	1	53,30807	143,24674	2385
29.VIII	7	1,5	GW	1	53,14154	143,29003	1470
29.VIII	9	4,5	GW	1	53,13858	143,28253	1031
29.VIII	9	3	GW	2	53,13941	143,29476	1852
29.VIII	9	2	GW	1	53,13885	143,30814	2728
29.VIII	9	2,5	GW	1	53,13843	143,30178	2301
29.VIII	9	10	HP	2	53,12781	143,28289	888
29.VIII	9	1,5	GW	1	53,1364	143,31892	3403
29.VIII	9	2	GW	1	53,12652	143,31455	2960
29.VIII	9	3	GW	1	53,12509	143,30455	2277
29.VIII	9	2,5	GW	2	53,12348	143,30883	2535
29.VIII	9	2,5	GW	1	53,11345	143,30381	2049
29.VIII	9	2,5	GW	1	53,11241	143,30276	1963
29.VIII	9	1,5	GW	1	53,09871	143,29888	1494
29.VIII	9	0,5	GW	2	53,07664	143,29676	1013
29.VIII	11	0,5	GW	2	53,09819	143,306	2082
29.VIII	11	1,5	GW	1	53,07962	143,30169	1527
29.VIII	11	1	GW	2	53,0873	143,29767	1372
29.VIII	11	2	GW	2	53,07462	143,30236	1499
29.VIII	11	0,5	GW	1	53,09562	143,31764	2817
29.VIII	11	2,5	GW	1	53,0714	143,30116	1372
29.VIII	11	1,5	GW	1	53,0748	143,31547	2370
29.VIII	11	1,5	GW	1	53,02521	143,30137	716
29.VIII	13	5	GW	1	52,98889	143,31026	754
29.VIII	15	1,5	GW	1	52,90623	143,32303	612
29.VIII	15	2,5	GW	1	52,89862	143,33004	953
29.VIII	15	1,5	GW	1	52,88815	143,35847	2668
30.VIII	1	1	GW	1	53,37134	143,19639	1292
30.VIII	3	7,5	GW	2	53,35057	143,21191	1501
30.VIII	3	7,5	GW	1	53,3504	143,21235	1524
30.VIII	3	18	GW	1	53,34163	143,20632	863
30.VIII	3	7,5	GW	1	53,34781	143,21767	1781
30.VIII	3	13	GW	2	53,3412	143,21327	1292
30.VIII	3	10	GW	2	53,34221	143,217	1561
30.VIII	3	10	GW	2	53,34132	143,21777	1582
30.VIII	3	10	GW	3	53,33399	143,22	1493
30.VIII	3	13	GW	1	53,33357	143,21582	1213
30.VIII	3	13	GW	1	53,33204	143,21462	1089
30.VIII	3	5	GW	1	53,31709	143,22354	1184
30.VIII	3	4	GW	1	53,30919	143,21562	430
30.VIII	5	3	GW	2	53,30954	143,22408	953
30.VIII	5	3	GW	2	53,30957	143,22542	1041
30.VIII	5	2,5	GW	1	53,31451	143,2297	1442
30.VIII	5	1,5	GW	1	53,32912	143,23235	1979
30.VIII	5	2,5	GW	1	53,31286	143,24884	2641
30.VIII	5	10	GW	1	53,24979	143,25192	1263
30.VIII	5	10	GW	1	53,25058	143,25308	1358
30.VIII	5	8,5	GW	1	53,24682	143,25338	1283
30.VIII	5	8,5	GW	1	53,24655	143,25289	1244
30.VIII	5	7,5	GW	1	53,24373	143,2532	1194
30.VIII	5	1	GW	1	53,19264	143,28062	1693
30.VIII	7	3,5	GW	1	53,20566	143,26327	1016

29.VIII	7	7,5	GW	1	53,17448	143,27969	1460
29.VIII	7	1,5	GW	1	53,15317	143,3129	3205
29.VIII	7	2,5	GW	1	53,15544	143,29253	1915
30.VIII	7	4	GW	1	53,19947	143,2788	1908
30.VIII	7	4	GW	1	53,19898	143,27994	1973
30.VIII	7	5	MW	1	53,19182	143,28361	2068
30.VIII	7	6,5	GW	1	53,1788	143,28413	1838
30.VIII	7	2	GW	1	53,15489	143,30212	2533
30.VIII	7	1,5	GW	2	53,14307	143,29438	1785
30.VIII	7	1	GW	1	53,1346	143,29972	1964
30.VIII	9	1,5	GW	1	53,15628	143,26528	165
30.VIII	9	0,5	GW	1	53,17588	143,26819	661
30.VIII	9	2	GW	1	53,15138	143,27685	854
30.VIII	9	3	GW	1	53,12796	143,30419	2298
30.VIII	9	1,5	GW	1	53,12077	143,32203	3366
30.VIII	9	2,5	GW	1	53,116	143,3059	2226
30.VIII	9	1,5	GW	1	53,108	143,3142	2651
30.VIII	9	2,5	GW	1	53,10776	143,29623	1459
30.VIII	9	3	GW	1	53,11071	143,29501	1424
30.VIII	9	2	GW	2	53,10346	143,29646	1408
30.VIII	9	1	GW	1	53,08935	143,29447	1058
30.VIII	9	0,5	GW	1	53,07787	143,30232	1399
30.VIII	11	1,5	GW	1	53,08089	143,29441	1062
30.VIII	11	1,5	GW	2	53,07816	143,30707	1862
30.VIII	11	2	GW	2	53,07403	143,30427	1617
30.VIII	11	1	GW	1	53,07993	143,32257	2915
30.VIII	11	1	GW	1	53,07784	143,32641	3140
30.VIII	11	2	GW	1	53,06736	143,31717	2375
30.VIII	11	0,5	GW	1	53,0819	143,34665	4540
30.VIII	11	1	GW	1	53,02016	143,31001	1215
30.VIII	13	1,5	GW	1	53,00679	143,31522	1344
30.VIII	13	5	GW	1	52,98581	143,31905	1293
30.VIII	13	4	GW	1	52,98742	143,32284	1569
30.VIII	13	4,5	GW	1	52,98486	143,32343	1571
30.VIII	13	0,5	GW	1	52,99297	143,38571	5825
30.VIII	13	1	GW	1	52,95665	143,36312	3797
30.VIII	13	1,5	GW	1	52,94171	143,3139	311
30.VIII	15	1,5	GW	1	52,90626	143,32234	567
30.VIII	15	1,5	GW	1	52,90619	143,32373	658
30.VIII	15	0,5	GW	3	52,87264	143,38476	4159
30.VIII	15	2,5	GW	1	52,86736	143,33531	788
30.VIII	15	3	GW	1	52,86843	143,33154	555
4.IX	1	0,5	GW	1	53,4727	143,18498	4152
4.IX	1	1,5	GW	1	53,37849	143,1888	1067
4.IX	3	4	GW	1	53,36302	143,18581	232
4.IX	3	10	GW	1	53,34575	143,21233	1375
4.IX	3	3	GW	1	53,35089	143,24698	3745
4.IX	3	1	GW	2	53,28099	143,23887	1020
4.IX	3	1,5	GW	1	53,29069	143,23442	1043
4.IX	3	0,5	GW	1	53,26291	143,23836	416
4.IX	3	0,5	GW	2	53,26336	143,24047	564
4.IX	3	0,5	GW	1	53,26247	143,23624	268
4.IX	5	1	GW	1	53,33964	143,20172	256
4.IX	5	2	GW	1	53,32078	143,22332	1185
4.IX	5	2	GW	2	53,31895	143,25151	2967
4.IX	5	2	GW	1	53,29578	143,30642	5947
4.IX	5	6	GW	1	53,28052	143,26748	3040
5.IX	3	2,5	GW	1	53,30878	143,24223	2112
5.IX	3	2,5	GW	2	53,30692	143,23903	1849
5.IX	3	2,5	GW	1	53,30647	143,2382	1782
5.IX	3	1,5	GW	1	53,29483	143,2456	1886
5.IX	3	4	GW	2	53,30899	143,21486	375
5.IX	3	1	GW	1	53,27972	143,23407	674
5.IX	5	13	GW	1	53,28027	143,228	475

30.VIII	7	2,5	GW	2	53,21147	143,26782	1432
30.VIII	7	13	GW	2	53,18898	143,26144	557
30.VIII	7	2,5	GW	1	53,20996	143,276	1937
4.09	5	10	GW	1	53,27237	143,25736	2180
4.09	5	30	GW	1	53,26512	143,23999	873
4.09	5	8	GW	1	53,27097	143,26516	2651
4.09	5	6	GW	1	53,26924	143,2756	3285
4.09	5	9	GW	1	53,26166	143,26361	2318
4.09	5	22	GW	1	53,25821	143,24254	865
4.09	7	4	GW	2	53,20377	143,25563	476
4.09	7	2,5	GW	1	53,21211	143,26125	1014
4.09	7	2	GW	1	53,21622	143,26628	1427
4.IX	7	3,5	GW	2	53,20549	143,26479	1111
4.IX	7	5	GW	1	53,19927	143,26632	1085
4.IX	7	6	GW	2	53,19669	143,26549	979
4.IX	7	7,5	GW	1	53,19304	143,26762	1045
4.IX	7	4	GW	1	53,19792	143,28214	2095
4.IX	7	7,5	GW	1	53,19161	143,27133	1259
4.IX	7	5	GW	1	53,18365	143,28963	2297
4.IX	7	1	GW	1	53,1337	143,29707	1773
4.IX	7	1,5	GW	1	53,13961	143,28321	983
4.IX	9	1	GW	1	53,16345	143,26754	425
4.IX	9	1	GW	1	53,16348	143,2709	648
4.IX	9	1,5	GW	1	53,15524	143,28429	1405
4.IX	9	4	GW	2	53,12595	143,29825	1874
4.IX	9	0,5	GW	1	53,07787	143,30232	1399
4.IX	9	0,5	GW	1	53,07664	143,29676	1013
4.IX	9	0,5	GW	1	53,07637	143,29535	915
4.IX	11	2,5	GW	2	53,04385	143,31721	2036
4.IX	11	1	GW	1	53,02481	143,32225	2094
4.IX	11	1,5	GW	2	53,02818	143,31114	1406
4.IX	11	1,5	GW	1	53,02846	143,31184	1457
4.IX	11	1,5	GW	1	53,0279	143,31043	1355
4.IX	11	1,5	GW	1	53,02737	143,30899	1252
4.IX	11	1	GW	1	53,02071	143,31187	1346
4.IX	11	2,5	GW	1	53,03202	143,2952	405
4.IX	11	0,5	GW	1	53,00788	143,31204	1171
4.IX	13	1,5	GW	1	53,00735	143,31047	1037
4.IX	13	3,5	GW	2	52,99088	143,3204	1457
4.IX	13	3,5	GW	2	52,98871	143,32489	1723
4.IX	13	3,5	GW	1	52,98847	143,3253	1747
4.IX	13	2,5	GW	1	52,98456	143,33966	2644
4.IX	13	2	GW	2	52,9804	143,34822	3152
4.IX	13	7,5	GW	1	52,97615	143,32039	1242
4.IX	13	5	GW	2	52,97603	143,32743	1708
4.IX	13	3	GW	1	52,95882	143,32813	1505
4.IX	13	1	GW	1	52,93608	143,32558	1005
4.IX	15	0,5	GW	1	52,92253	143,32291	872
4.IX	15	1	GW	1	52,91127	143,3315	1258
4.IX	15	1	GW	1	52,91114	143,33234	1311
4.IX	15	7	GW	2	52,87539	143,3269	362
5.IX	1	1,5	GW	2	53,38049	143,19364	1442
5.IX	1	2	GW	1	53,38272	143,18193	784
5.IX	3	3	GW	1	53,35089	143,24698	3745
5.IX	3	3	GW	2	53,35089	143,24698	3745
5.IX	3	1,5	GW	1	53,30596	143,26405	3413
5.IX	3	1,5	GW	1	53,30253	143,25953	3016
5.IX	15	0,5	GW	1	52,84512	143,34623	1147
6.IX	3	10	GW	2	53,33625	143,22001	1565
6.IX	3	10	GW	2	53,3365	143,21998	1571
6.IX	3	13	GW	6	53,33669	143,21584	1313
6.IX	3	25	GW	2	53,33588	143,20678	710
6.IX	3	20	GW	2	53,33604	143,20919	869
6.IX	3	20	GW	2	53,33549	143,20926	856

5.IX	5	7,5	GW	1	53,28828	143,23352	1033
5.IX	5	7,5	GW	3	53,28763	143,23854	1342
5.IX	5	1	GW	1	53,33564	143,2752	4920
5.IX	5	5,5	GW	2	53,29125	143,25157	2277
5.IX	5	0,5	GW	2	53,34716	143,31027	7482
5.IX	5	7,5	GW	2	53,28549	143,24734	1859
5.IX	5	4	GW	1	53,29239	143,27028	3519
5.IX	5	4,5	GW	1	53,28855	143,27017	3416
5.IX	5	6,5	GW	2	53,27313	143,27092	3079
5.IX	5	3	GW	3	53,27328	143,30252	5131
5.IX	5	20	GW	1	53,26566	143,24566	1254
5.IX	5	5	GW	1	53,25495	143,28135	3300
5.IX	5	6	GW	1	53,25018	143,27129	2528
5.IX	5	15	GW	2	53,25165	143,24113	610
5.IX	5	1	GW	3	53,20248	143,30767	3693
5.IX	7	2	GW	2	53,21636	143,24689	159
5.IX	7	0,5	GW	1	53,24526	143,28053	2950
5.IX	7	1	GW	1	53,22836	143,28658	3004
5.IX	7	3,5	GW	1	53,20479	143,26925	1390
5.IX	7	0,5	GW	2	53,23624	143,31651	5125
5.IX	7	3	GW	1	53,20072	143,28951	2635
5.IX	7	3	GW	1	53,20107	143,28889	2602
5.IX	7	1,5	GW	1	53,15258	143,31212	3142
5.IX	9	1	GW	1	53,16341	143,27426	869
5.IX	9	2,5	GW	1	53,13776	143,30254	2341
5.IX	9	3,5	GW	1	53,12637	143,30101	2064
5.IX	9	4,5	GW	2	53,12344	143,29584	1676
5.IX	9	4	GW	1	53,11956	143,29681	1680
5.IX	9	4	GW	1	53,11818	143,29592	1600
5.IX	9	3	GW	1	53,11263	143,29772	1634
5.IX	11	1	GW	1	53,08766	143,29462	1175
5.IX	11	1,5	GW	1	53,08078	143,29523	1116
5.IX	11	2	GW	1	53,07614	143,29569	1078
5.IX	11	2,5	GW	1	53,07205	143,29892	1233
5.IX	11	4	GW	1	53,05468	143,31009	1721
5.IX	11	2	GW	4	53,03952	143,31944	2121
5.IX	11	1,5	GW	1	53,02664	143,30677	1094
5.IX	11	1,5	GW	1	53,02688	143,30752	1147
5.IX	13	2,5	GW	1	52,99632	143,32125	1592
5.IX	13	2,5	GW	2	52,99591	143,32251	1670
5.IX	13	3	GW	1	52,99248	143,32294	1649
5.IX	13	1	GW	1	52,93687	143,32888	1236
5.IX	13	1	GW	1	52,93608	143,32558	1005
5.IX	15	3,5	GW	1	52,88856	143,34019	1461
5.IX	15	2,5	GW	1	52,87542	143,3466	1671
5.IX	15	3,5	GW	1	52,87034	143,33171	598
5.IX	15	1,5	GW	2	52,8599	143,33492	640
7.IX	5	4	GW	1	53,3021	143,22231	652
7.IX	5	11	GW	1	53,28208	143,22918	597
7.IX	5	4	GW	1	53,30213	143,23135	1239
7.IX	5	4	GW	1	53,30217	143,23022	1167
7.IX	5	9	GW	4	53,28417	143,23889	1278
7.IX	5	0,5	GW	1	53,35567	143,27936	5691
7.IX	5	4	GW	1	53,29971	143,25008	2392
7.IX	5	4	GW	1	53,29921	143,25218	2516
7.IX	5	4	GW	1	53,29894	143,25322	2577
7.IX	5	9,5	GW	1	53,28307	143,23956	1294
7.IX	5	9	GW	3	53,28206	143,24638	1711
7.IX	5	3	GW	1	53,30137	143,27107	3795
7.IX	5	19	GW	1	53,2726	143,24033	1083
7.IX	5	4	GW	1	53,28694	143,27872	3930
7.IX	5	9	GW	1	53,27448	143,25874	2323
7.IX	5	28	GW	1	53,26648	143,24018	920
7.IX	5	2	GW	1	53,28147	143,31825	6356

6.IX	3	15	GW	1	53,33327	143,21281	1012
6.IX	3	15	GW	1	53,33155	143,212	906
6.IX	3	13	GW	1	53,33154	143,21505	1100
6.IX	7	4	GW	1	53,20262	143,2681	1270
6.IX	7	4	GW	2	53,19251	143,28993	2496
6.IX	7	1,5	GW	2	53,15377	143,31366	3267
6.IX	7	2,5	GW	1	53,15229	143,28577	1408
6.IX	9	2,5	GW	1	53,14769	143,27865	915
6.IX	9	3	GW	1	53,14496	143,27886	887
6.IX	9	4	GW	1	53,13657	143,29062	1535
6.IX	9	4,5	GW	1	53,13327	143,29197	1572
6.IX	9	3	GW	1	53,11939	143,30326	2104
6.IX	9	4	GW	1	53,11846	143,29611	1617
6.IX	11	1	GW	2	53,08805	143,28948	840
6.IX	11	2	GW	1	53,07677	143,2908	764
6.IX	11	2	GW	1	53,0767	143,29151	809
6.IX	11	2	GW	1	53,07654	143,29291	900
6.IX	11	1,5	GW	1	53,07862	143,30556	1769
6.IX	11	1	GW	1	53,02404	143,32062	1975
6.IX	11	1	GW	1	53,02366	143,31979	1914
6.IX	11	0,5	GW	1	53,00788	143,31204	1171
6.IX	13	2,5	GW	1	52,9945	143,32614	1891
6.IX	13	4	GW	3	52,98764	143,32246	1547
6.IX	13	4	GW	2	52,98742	143,32284	1569
6.IX	13	4	GW	1	52,98628	143,32466	1673
6.IX	13	4,5	GW	1	52,98346	143,32514	1664
6.IX	13	4	GW	1	52,9858	143,32533	1711
6.IX	13	4	GW	1	52,9848	143,32661	1781
6.IX	13	3,5	GW	1	52,97857	143,33433	2204
6.IX	15	1,5	GW	1	52,9049	143,33323	1267
6.IX	15	2	GW	1	52,89927	143,33792	1487
6.IX	15	3	GW	1	52,88603	143,34464	1715
6.IX	15	4,5	GW	1	52,87599	143,33579	962
6.IX	15	1	GW	1	52,85637	143,34478	1236
6.IX	15	1	GW	1	52,85321	143,33201	336
7.IX	1	3,5	GW	1	53,42763	143,18489	2556
7.IX	3	1,5	GW	3	53,36117	143,2676	5383
7.IX	3	1,5	GW	1	53,35497	143,27297	5529
7.IX	3	4,5	GW	1	53,32173	143,23388	1989
7.IX	3	4,5	GW	1	53,3154	143,22507	1228
7.IX	3	5	GW	1	53,31625	143,22192	1054
7.IX	3	20	GW	2	53,32869	143,20366	285
7.IX	3	1	GW	1	53,28749	143,2568	2367
7.IX	3	10	GW	1	53,32342	143,20991	516
7.IX	3	15	GW	1	53,32714	143,2066	423
7.IX	3	15	GW	1	53,32634	143,20462	271
7.IX	3	5	GW	1	53,31255	143,21152	275
7.IX	15	1	GW	1	52,85561	143,3425	1073
8.IX	1	1	GW	3	53,40345	143,233	4728
8.IX	1	2	GW	1	53,40787	143,21007	3442
8.IX	1	1	GW	1	53,39215	143,22695	3948
8.IX	1	0,5	GW	1	53,35849	143,20783	1558
8.IX	3	3,5	GW	1	53,36583	143,20476	1528
8.IX	3	2	GW	2	53,37535	143,22276	2975
8.IX	3	1,5	GW	1	53,37949	143,23494	3882
8.IX	3	1,5	GW	2	53,37729	143,24126	4215
8.IX	3	1	GW	1	53,37992	143,26275	5666
8.IX	3	1	GW	1	53,3785	143,26532	5785
8.IX	3	9,5	GW	2	53,34297	143,21745	1614
8.IX	3	7	GW	1	53,3313	143,22728	1871
8.IX	3	3	GW	1	53,32085	143,24812	2868
8.IX	3	2	GW	2	53,30584	143,24921	2463
8.IX	3	2	GW	1	53,30529	143,24834	2391
8.IX	3	1	GW	1	53,29453	143,26974	3414

7.IX	5	6	GW	1	53,23964	143,25641	1300
7.IX	5	1	GW	1	53,19778	143,29658	2857
7.IX	7	0,5	GW	1	53,24662	143,24547	679
7.IX	7	0,5	GW	2	53,2468	143,24938	938
7.IX	7	0,5	GW	1	53,24685	143,25133	1068
7.IX	7	0,5	GW	1	53,2444	143,28623	3306
7.IX	7	3,5	MW	1	53,19739	143,28847	2500
7.IX	7	2,5	GW	1	53,20029	143,29803	3185
7.IX	7	5	GW	1	53,19182	143,28361	2068
7.IX	7	5	GW	3	53,18642	143,28836	2270
7.IX	7	4,5	GW	1	53,18088	143,29293	2457
7.IX	7	5	GW	1	53,18151	143,29015	2287
7.IX	7	4,5	GW	1	53,18127	143,29289	2462
7.IX	7	4	GW	1	53,17347	143,29485	2433
7.IX	7	2,5	GW	2	53,16008	143,29955	2469
7.IX	7	1	GW	1	53,14561	143,32178	3633
7.IX	7	1	GW	2	53,13328	143,29573	1676
7.IX	9	1	GW	1	53,16329	143,27649	1014
7.IX	9	1	GW	1	53,16304	143,27983	1231
7.IX	9	1,5	GW	2	53,15418	143,28949	1732
7.IX	9	1,5	GW	1	53,15475	143,28691	1571
7.IX	9	1,5	GW	1	53,15354	143,29201	1889
7.IX	9	2	GW	1	53,14553	143,29855	2197
7.IX	9	2,5	GW	1	53,13941	143,30056	2236
7.IX	9	3	GW	2	53,13147	143,30281	2261
7.IX	9	1,5	GW	2	53,11135	143,31732	2909
7.IX	9	0,5	GW	1	53,07895	143,30638	1684
7.IX	9	5	HP	1	53,11203	143,28032	474
7.IX	11	0,5	GW	2	53,0966	143,31384	2579
7.IX	11	0,5	GW	1	53,08901	143,33511	3878
7.IX	11	2,5	GW	1	53,06792	143,30921	1855
7.IX	11	3,5	GW	2	53,049	143,31237	1790
7.IX	13	0,5	GW	1	53,02742	143,31557	1666
7.IX	13	1,5	GW	1	53,00335	143,32956	2246
7.IX	13	2,5	GW	1	52,95985	143,33556	2013
7.IX	15	1,5	GW	1	52,90517	143,33191	1184
7.IX	15	0,5	GW	2	52,84807	143,35551	1813
8.IX	7	5	GW	1	53,17755	143,29012	2206
8.IX	7	4	GW	1	53,17145	143,29381	2324
8.IX	7	4	GW	1	53,16989	143,29276	2224
8.IX	7	3,5	GW	2	53,16133	143,28774	1720
8.IX	7	3,5	GW	1	53,16068	143,28665	1636
8.IX	7	3,5	GW	1	53,16004	143,28553	1550
8.IX	7	3,5	GW	1	53,16167	143,28826	1762
8.IX	7	2,5	GW	1	53,15432	143,29037	1751
8.IX	7	4	GW	1	53,16012	143,27971	1170
8.IX	7	1,5	GW	1	53,14085	143,28779	1309
8.IX	9	1	GW	2	53,16239	143,28532	1584
8.IX	9	2	GW	1	53,15027	143,28439	1335
8.IX	9	1	GW	1	53,16205	143,28748	1722
8.IX	9	1,5	GW	1	53,15398	143,29033	1785
8.IX	9	1,5	GW	1	53,1533	143,29283	1940
8.IX	9	1,5	GW	1	53,15281	143,29447	2040
8.IX	9	4	GW	1	53,13679	143,29028	1516
8.IX	9	3,5	GW	1	53,13572	143,2954	1838
8.IX	9	2,5	GW	1	53,13908	143,30098	2258
8.IX	9	1	GW	1	53,09518	143,31076	2225
8.IX	9	1,5	GW	2	53,09902	143,29964	1549
8.IX	9	1	GW	1	53,08767	143,28597	470
8.IX	11	1,5	GW	2	53,08146	143,28689	572
8.IX	11	1	GW	1	53,08586	143,30562	1878
8.IX	11	2	GW	1	53,06702	143,3176	2399
8.IX	11	3	GW	1	53,04453	143,31327	1785
8.IX	11	0,5	GW	1	53,01142	143,32449	2048

8.IX	3	3,5	GW	1	53,31144	143,22968	1397
8.IX	3	1,5	GW	2	53,29432	143,24442	1794
8.IX	3	1,5	GW	1	53,2911	143,23572	1139
8.IX	3	0,5	GW	1	53,26713	143,25479	1596
8.IX	3	4	GW	2	53,30899	143,21486	375
8.IX	3	1,5	GW	1	53,2892	143,22914	659
8.IX	3	1,5	GW	1	53,29152	143,237	1234
8.IX	5	6,5	GW	2	53,29098	143,21963	200
8.IX	5	6,5	GW	1	53,29133	143,2253	576
8.IX	5	0,5	GW	1	53,3606	143,23767	3112
8.IX	5	12	GW	1	53,28109	143,23328	837
8.IX	5	12	GW	2	53,28079	143,23532	962
8.IX	5	10	GW	1	53,28293	143,23571	1041
8.IX	5	11	GW	1	53,28235	143,23429	935
8.IX	5	6	GW	1	53,2905	143,24702	1964
8.IX	5	7	GW	5	53,28834	143,24207	1589
8.IX	5	6,5	GW	1	53,28815	143,24885	2024
8.IX	5	4,5	GW	1	53,28986	143,26791	3302
8.IX	5	3,5	GW	1	53,28778	143,28462	4333
8.IX	5	3,5	GW	1	53,28718	143,28532	4364
8.IX	5	60	HP	2	53,26487	143,23361	453
8.IX	5	8	GW	1	53,25738	143,26588	2357
8.IX	5	8,5	GW	1	53,2511	143,25933	1776
8.IX	5	4	GW	1	53,24083	143,2798	2846
8.IX	5	4,5	GW	1	53,23645	143,26682	1895
8.IX	5	2,5	GW	1	53,21935	143,27026	1690
8.IX	5	2,5	GW	2	53,21847	143,26766	1499
8.IX	5	0,5	GW	2	53,17403	143,29155	1936
8.IX	5	1,5	GW	1	53,20307	143,27065	1308
8.IX	5	1	GW	1	53,18927	143,2658	648
8.IX	7	2,5	GW	1	53,21134	143,26875	1490
8.IX	7	1	GW	1	53,23113	143,269	1907
8.IX	7	1	GW	1	53,23098	143,27049	2002
8.IX	7	0,5	GW	2	53,24372	143,28999	3538
8.IX	7	1	GW	2	53,22245	143,30535	4114
8.IX	7	7	GW	1	53,18793	143,27869	1667
8.IX	7	5	GW	1	53,17863	143,29026	2236
10.IX	5	5	GW	1	53,29479	143,24697	2068
10.IX	5	3	GW	2	53,3066	143,25443	2847
10.IX	5	3	GW	1	53,30227	143,26883	3672
10.IX	5	4	GW	1	53,26971	143,29112	4303
10.IX	5	3	GW	1	53,25967	143,30403	4888
10.IX	5	4	GW	1	53,24787	143,28651	3457
10.IX	5	1,5	GW	3	53,2289	143,32069	5198
10.IX	5	2,5	GW	1	53,23437	143,29738	3824
10.IX	5	6	GW	1	53,24498	143,26571	2037
10.IX	5	4	GW	1	53,23869	143,27703	2613
10.IX	5	2,5	GW	2	53,22816	143,28891	3120
10.IX	5	2,5	GW	1	53,22752	143,28787	3036
10.IX	7	5	GW	1	53,20021	143,25386	288
10.IX	7	1	GW	1	53,23167	143,25994	1324
10.IX	7	2,5	GW	1	53,2118	143,26503	1255
10.IX	7	3	GW	2	53,20798	143,26738	1332
10.IX	7	1	GW	1	53,22867	143,28516	2917
10.IX	7	3	GW	1	53,20635	143,27543	1826
10.IX	7	13	GW	2	53,18668	143,26753	910
10.IX	7	13	GW	1	53,18631	143,26814	942
10.IX	7	1,5	GW	2	53,18434	143,32752	4795
10.IX	7	4,5	GW	2	53,18127	143,29289	2462
10.IX	7	7,5	GW	2	53,1773	143,28088	1595
10.IX	7	3,5	GW	1	53,17112	143,29763	2567
10.IX	7	3,5	GW	2	53,16982	143,29683	2489
10.IX	7	2,5	GW	1	53,15432	143,29037	1751
10.IX	7	1,5	GW	1	53,14267	143,29331	1707

8.IX	11	0,5	GW	1	53,00985	143,31964	1703
8.IX	13	2	GW	1	52,998	143,32828	2084
8.IX	13	2	GW	1	52,99772	143,32896	2125
8.IX	13	3	GW	1	52,99156	143,32499	1772
8.IX	13	2,5	GW	1	52,97317	143,34327	2718
10.IX	1	1	GW	2	53,45391	143,19566	4161
10.IX	1	1,5	GW	2	53,41968	143,21914	4429
10.IX	1	0,5	GW	2	53,41282	143,25877	6679
10.IX	1	0,5	GW	1	53,35444	143,19468	588
10.IX	1	0,5	GW	1	53,35684	143,20301	1197
10.IX	3	0,5	GW	1	53,41112	143,17969	1362
10.IX	3	0,5	GW	1	53,41105	143,21316	3491
10.IX	3	1	GW	1	53,39406	143,21461	3047
10.IX	3	1,5	GW	1	53,37423	143,24839	4572
10.IX	3	6,5	GW	2	53,3438	143,22655	2219
10.IX	3	2,5	GW	1	53,32939	143,25922	3845
10.IX	3	2,5	GW	1	53,32548	143,25786	3635
10.IX	3	6,5	GW	2	53,32579	143,22591	1610
10.IX	3	6,5	GW	2	53,32548	143,22563	1582
10.IX	3	2,5	GW	1	53,31741	143,25262	3046
10.IX	5	4	GW	1	53,30205	143,22118	578
10.IX	5	2,5	GW	1	53,31445	143,22225	957
10.IX	5	5	GW	1	53,29695	143,2259	756
10.IX	5	4	GW	4	53,3022	143,22909	1094
10.IX	5	1,5	GW	1	53,32608	143,26059	3734
10.IX	5	2,5	GW	2	53,31091	143,25875	3235
10.IX	5	2,5	GW	1	53,31123	143,25736	3153
11.IX	3	1	GW	1	53,28099	143,23887	1020
11.IX	3	1	GW	1	53,29935	143,27645	3994
11.IX	3	1	GW	1	53,3002	143,27749	4086
11.IX	3	1	GW	1	53,29852	143,27539	3900
11.IX	3	4	GW	1	53,35164	143,23494	3002
11.IX	3	2	GW	2	53,36256	143,25203	4435
11.IX	3	0,5	GW	2	53,40923	143,22852	4412
11.IX	3	3	GW	1	53,36944	143,19568	1064
11.IX	3	1	GW	1	53,39508	143,19896	2082
11.IX	3	0,5	GW	1	53,41174	143,19531	2376
11.IX	3	1,5	GW	1	53,38492	143,18678	986
11.IX	3	1	GW	1	53,39462	143,18323	1066
11.IX	3	1	GW	1	53,39448	143,18149	951
11.IX	3	0,5	GW	2	53,41073	143,17526	1068
11.IX	5	3,5	GW	1	53,24453	143,29006	3604
11.IX	5	15	GW	1	53,25882	143,25006	1368
11.IX	5	16	GW	1	53,25929	143,24896	1309
11.IX	5	4	GW	1	53,2769	143,28795	4277
11.IX	5	6	GW	1	53,27418	143,27319	3252
11.IX	5	4	GW	2	53,27753	143,28755	4267
11.IX	5	4	GW	2	53,27878	143,28669	4242
11.IX	5	0,5	GW	2	53,35878	143,26018	4526
11.IX	5	1	GW	1	53,34003	143,24906	3335
11.IX	7	1	GW	1	53,13137	143,28884	1186
11.IX	7	3,5	GW	1	53,16772	143,29525	2343
11.IX	7	3	GW	2	53,16786	143,30047	2687
11.IX	7	1	GW	1	53,214	143,32118	4981
11.IX	7	0,5	GW	5	53,24372	143,28999	3538
11.IX	7	0,5	GW	1	53,24407	143,28811	3422
11.IX	7	0,5	GW	1	53,24335	143,29185	3653
11.IX	7	1	GW	1	53,23172	143,25538	1027
11.IX	7	3	GW	1	53,20863	143,25049	238
11.IX	9	0,5	GW	1	53,08194	143,31546	2331
11.IX	9	3	GW	1	53,11097	143,29542	1456
11.IX	9	0,5	GW	2	53,174	143,29308	2277
11.IX	9	0,5	GW	1	53,17375	143,2945	2367
11.IX	11	7,5	GW	1	53,04591	143,296	660
10.IX	7	1	GW	1	53,13287	143,29438	1579
10.IX	9	1,5	GW	1	53,1564	143,27167	589
10.IX	9	1,5	GW	1	53,15638	143,27259	649
10.IX	9	1,5	GW	1	53,15605	143,27804	1005
10.IX	9	1,5	GW	1	53,15492	143,28604	1516
10.IX	9	0,5	GW	1	53,1683	143,31471	3618
10.IX	9	2,5	GW	1	53,13707	143,30326	2378
10.IX	9	3	HP	1	53,13509	143,30014	2141
10.IX	9	25	GW	1	53,12506	143,27609	396
10.IX	9	4	GW	2	53,11928	143,29664	1665
10.IX	9	4	GW	1	53,11792	143,29572	1583
10.IX	9	1,5	GW	1	53,09611	143,29084	923
10.IX	11	1	GW	1	53,08766	143,29462	1175
10.IX	11	1	GW	2	53,08608	143,30464	1816
10.IX	13	2,5	GW	1	52,95459	143,32707	1373
10.IX	15	5	HP	1	52,88946	143,33253	967
10.IX	15	2	GW	2	52,89334	143,34786	2049
11.IX	1	1	GW	1	53,37591	143,20665	2099
11.IX	1	0,5	GW	1	53,36649	143,22546	2949
11.IX	1	2	GW	1	53,40316	143,20844	3173
11.IX	1	6,5	GW	3	53,41312	143,17889	1666
11.IX	1	1	GW	1	53,43096	143,22831	5404
11.IX	1	1,5	GW	1	53,42775	143,21518	4465
11.IX	1	5,5	GW	2	53,42441	143,17473	1803
11.IX	1	2,5	GW	1	53,434	143,18846	3005
11.IX	1	5	GW	2	53,42812	143,1709	1694
11.IX	3	1	GW	1	53,28144	143,24045	1135
13.IX	1	1	GW	1	53,42534	143,23153	5408
13.IX	1	1	GW	3	53,4102	143,23433	5049
13.IX	1	1	GW	2	53,41105	143,23439	5083
13.IX	1	1	GW	2	53,40014	143,23175	4532
13.IX	1	1,5	GW	1	53,37776	143,18679	915
13.IX	1	1	GW	2	53,37134	143,19639	1292
13.IX	1	1	GW	2	53,36962	143,19147	922
13.IX	3	2,5	GW	1	53,37297	143,18675	606
13.IX	3	6,5	GW	1	53,35507	143,20168	992
13.IX	3	1	GW	1	53,39314	143,22145	3454
13.IX	3	4	GW	1	53,36184	143,21285	1917
13.IX	3	1	GW	2	53,39086	143,23309	4123
13.IX	3	1	GW	3	53,38962	143,23792	4391
13.IX	3	2,5	GW	1	53,36324	143,23936	3650
13.IX	3	3,5	GW	1	53,3569	143,23327	3061
13.IX	3	2,5	GW	4	53,33204	143,25974	3962
13.IX	3	9	GW	2	53,33199	143,22168	1537
13.IX	3	10	GW	1	53,33128	143,21918	1355
13.IX	3	9	GW	1	53,33253	143,22185	1564
13.IX	3	7,5	GW	1	53,32819	143,22394	1560
13.IX	3	7,5	GW	2	53,32566	143,22177	1342
13.IX	3	1	GW	1	53,28099	143,23887	1020
13.IX	3	2	GW	2	53,29575	143,22579	653
13.IX	3	1	GW	1	53,27827	143,22749	209
13.IX	5	1,5	GW	2	53,32833	143,20941	472
13.IX	5	2	GW	1	53,32073	143,22165	1075
13.IX	5	1	GW	1	53,34101	143,21969	1456
13.IX	5	5	GW	2	53,29679	143,23273	1195
13.IX	5	2	GW	1	53,31638	143,26419	3725
13.IX	5	15	GW	1	53,2739	143,24386	1344
13.IX	5	5	GW	1	53,28923	143,26295	2965
13.IX	5	2,5	GW	1	53,30218	143,28286	4580
13.IX	5	2	GW	1	53,30562	143,29223	5273
13.IX	5	13	GW	1	53,26383	143,25529	1833
13.IX	5	3,5	GW	1	53,26367	143,29756	4569
13.IX	5	65	GW	2	53,2634	143,23353	411
13.IX	5	2	GW	1	53,25378	143,32173	5888

11.IX	11	2	MW	1	53,04704	143,32454	2569
11.IX	11	3	GW	1	53,05872	143,31438	2065
11.IX	11	3	GW	1	53,06683	143,30518	1572
11.IX	11	1,5	GW	1	53,08078	143,29523	1116
11.IX	11	2	GW	2	53,07704	143,28297	248
11.IX	13	2,5	GW	1	52,95137	143,31773	706
11.IX	13	2	GW	1	52,94842	143,32151	914
11.IX	13	14	GW	2	52,97109	143,31155	582
11.IX	13	3	GW	1	52,98861	143,33003	2063
11.IX	15	0,5	GW	1	52,84458	143,34406	995
11.IX	15	2	GW	1	52,86401	143,33466	690
11.IX	15	2,5	GW	1	52,88321	143,34881	1945
11.IX	15	2,5	GW	2	52,89468	143,34022	1564
11.IX	15	2,5	GW	1	52,89714	143,33505	1261
11.IX	15	2	MW	1	52,90191	143,32772	853
13.IX	1	1	GW	1	53,43018	143,22884	5410
13.IX	1	1,5	GW	1	53,43094	143,21271	4422
13.IX	15	4	GW	1	52,89082	143,33492	1148
13.IX	15	2,5	GW	1	52,888	143,34722	1918
13.IX	15	1	GW	1	52,85809	143,34911	1552
13.IX	15	1	GW	1	52,85637	143,34478	1236
14.IX	1	1	GW	2	53,37045	143,19395	1108
14.IX	1	0,5	GW	1	53,36649	143,22546	2949
14.IX	1	0,5	GW	1	53,3881	143,25056	5290
14.IX	1	0,5	GW	3	53,39327	143,25376	5673
14.IX	1	0,5	GW	1	53,39433	143,2543	5745
14.IX	1	0,5	GW	2	53,40621	143,25825	6413
14.IX	1	1	GW	1	53,41359	143,2344	5174
14.IX	1	1	GW	2	53,41529	143,23429	5227
14.IX	3	3	GW	2	53,30303	143,21589	253
14.IX	3	0,5	GW	2	53,26247	143,23624	268
14.IX	3	2	GW	1	53,29575	143,22579	653
14.IX	3	0,5	GW	1	53,26595	143,25078	1303
14.IX	3	1	GW	1	53,28055	143,23728	905
14.IX	3	1	GW	1	53,28566	143,25254	2038
14.IX	3	1,5	GW	2	53,29589	143,24793	2068
14.IX	3	3,5	GW	1	53,31488	143,23548	1875
14.IX	3	1	GW	3	53,30457	143,28228	4530
14.IX	3	1	GW	1	53,38061	143,26143	5604
14.IX	3	1	GW	1	53,38259	143,25736	5407
14.IX	3	1	GW	1	53,38128	143,26009	5540
14.IX	3	1	GW	1	53,37992	143,26275	5666
14.IX	3	1	GW	1	53,38723	143,24571	4812
14.IX	3	1	GW	1	53,38871	143,24108	4564
14.IX	3	1	GW	1	53,38917	143,23951	4478
14.IX	5	0,5	GW	1	53,17274	143,2863	1563
14.IX	5	10	GW	1	53,24589	143,24365	629
14.IX	5	3	GW	1	53,22284	143,26373	1354
14.IX	5	10	GW	1	53,24606	143,24416	666
14.IX	5	4	GW	1	53,23303	143,26734	1843
14.IX	5	4	GW	1	53,23618	143,27323	2304
14.IX	5	5	GW	1	53,2416	143,26964	2206
14.IX	5	5,5	GW	1	53,24425	143,2687	2212
14.IX	5	1,5	GW	1	53,22324	143,31414	4632
14.IX	5	7,5	GW	1	53,25793	143,26814	2518
14.IX	5	9	GW	1	53,25753	143,26237	2134
14.IX	5	3,5	GW	2	53,27874	143,29276	4635
14.IX	5	4	GW	1	53,2769	143,28795	4277
14.IX	5	7,5	GW	1	53,28751	143,23924	1385
14.IX	5	7,5	GW	1	53,28763	143,23854	1342
14.IX	5	0,5	GW	1	53,35993	143,24898	3828
14.IX	5	0,5	GW	1	53,35969	143,25179	4004
14.IX	5	0,5	GW	1	53,35942	143,25459	4179
14.IX	5	4,5	GW	1	53,29926	143,23209	1215

13.IX	7	4,5	GW	1	53,2018	143,25305	267
13.IX	7	2	GW	1	53,21668	143,25227	518
13.IX	7	0,5	GW	1	53,24689	143,25329	1197
13.IX	7	1	GW	1	53,23167	143,25994	1324
13.IX	7	1	GW	1	53,22769	143,2894	3175
13.IX	7	6	GW	1	53,18815	143,28235	1911
13.IX	9	0,5	GW	1	53,17589	143,27116	857
13.IX	9	1,5	GW	1	53,15524	143,28429	1405
13.IX	9	4	GW	1	53,11585	143,29383	1426
13.IX	11	0,5	GW	1	53,09991	143,28833	936
13.IX	11	2	GW	1	53,03314	143,30998	1401
13.IX	13	3,5	GW	1	52,99125	143,31943	1398
13.IX	13	1,5	GW	1	52,94367	143,32402	1012
13.IX	13	1,5	GW	1	52,94415	143,32578	1136
13.IX	15	2,5	GW	1	52,8976	143,33373	1181
13.IX	15	2,5	GW	1	52,89745	143,33418	1208
13.IX	15	4	GW	1	52,89066	143,33517	1162
14.IX	7	1,5	GW	1	53,19875	143,32049	4626
14.IX	7	3	GW	1	53,20472	143,28072	2140
14.IX	7	1	GW	2	53,23082	143,27199	2097
14.IX	7	1	GW	1	53,23164	143,25083	727
14.IX	7	1	GW	1	53,23158	143,24932	626
14.IX	7	0,5	GW	1	53,2465	143,24352	548
14.IX	9	1,5	GW	1	53,1533	143,29283	1940
14.IX	9	0,5	GW	1	53,17484	143,28733	1909
14.IX	11	1	GW	2	53,02071	143,31187	1346
14.IX	11	1	GW	1	53,02043	143,31094	1280
14.IX	11	1	GW	1	53,0199	143,30906	1148
14.IX	11	2	GW	1	53,07704	143,28582	438
14.IX	13	1	GW	1	52,93608	143,32558	1005
14.IX	13	0,5	GW	1	52,92307	143,3286	1017
14.IX	13	0,5	GW	1	52,92431	143,33447	1425
14.IX	13	1	GW	2	52,93986	143,33828	1903
14.IX	13	1	GW	1	52,94024	143,33927	1975
14.IX	13	1	GW	1	52,99492	143,36057	4183
14.IX	13	3,5	GW	1	52,98871	143,32489	1723
14.IX	13	1	MW	1	53,01046	143,33357	2616
14.IX	13	1,5	GW	1	53,00492	143,32437	1925
14.IX	15	1,5	GW	1	52,86381	143,3456	1413
14.IX	15	1,5	GW	1	52,86437	143,34664	1492
14.IX	15	2	GW	1	52,88018	143,35321	2188
14.IX	15	3	GW	1	52,88707	143,34414	1698
14.IX	15	1,5	GW	1	52,90202	143,3425	1836
14.IX	15	1	GW	1	52,91019	143,33729	1624
14.IX	15	1	GW	2	52,91037	143,33647	1573
14.IX	15	1	GW	1	52,9107	143,33483	1470
15.IX	1	1,5	GW	1	53,43742	143,20571	4210
15.IX	1	1	GW	1	53,40513	143,23348	4817
15.IX	1	4	GW	1	53,40721	143,18908	2099
15.IX	1	5	GW	2	53,39799	143,17337	785
15.IX	3	2,5	GW	1	53,37318	143,20233	1606
15.IX	3	1	GW	2	53,3916	143,22981	3938
15.IX	3	1,5	GW	1	53,37477	143,24724	4516
15.IX	3	4	MW	1	53,35123	143,23542	3019
15.IX	3	1	GW	1	53,35694	143,28949	6644
15.IX	3	1	GW	1	53,34896	143,29366	6657
15.IX	3	1	GW	2	53,34382	143,2953	6599
15.IX	3	1	GW	1	53,33653	143,29632	6434
15.IX	3	2	GW	1	53,33163	143,26816	4485
15.IX	3	0,5	GW	2	53,26291	143,23836	416
15.IX	3	2	GW	1	53,29388	143,21752	67
15.IX	3	0,5	GW	1	53,26383	143,24256	713
15.IX	3	1,5	GW	1	53,28765	143,2223	175
15.IX	5	30	GW	1	53,27126	143,22847	280

14.IX	5	7,5	GW	1	53,28857	143,22695	614
14.IX	5	4	GW	2	53,3021	143,22231	652
14.IX	5	7,5	GW	2	53,28837	143,22183	278
14.IX	7	0,5	GW	1	53,1209	143,3108	2413
14.IX	7	0,5	GW	1	53,12209	143,31419	2659
14.IX	7	3,5	GW	1	53,16201	143,28878	1803
14.IX	7	25	HP	2	53,17944	143,2648	584
15.IX	5	10	GW	1	53,26461	143,26079	2208
15.IX	5	7,5	GW	1	53,26621	143,26892	2775
15.IX	5	7,5	GW	1	53,26577	143,26899	2769
15.IX	5	1,5	GW	2	53,24129	143,33065	6154
15.IX	5	7,5	GW	1	53,25498	143,26671	2352
15.IX	5	2,5	GW	2	53,24539	143,30706	4728
15.IX	5	9	GW	1	53,25328	143,25955	1845
15.IX	7	2	GW	1	53,21664	143,25119	446
15.IX	7	1,5	GW	1	53,22275	143,25169	603
15.IX	7	3,5	GW	1	53,20602	143,25407	419
15.IX	7	4	GW	1	53,20327	143,26402	1016
15.IX	7	9,5	GW	1	53,19126	143,26358	744
15.IX	7	6	GW	1	53,19636	143,26697	1069
15.IX	7	6,5	GW	2	53,19502	143,26768	1088
15.IX	7	3,5	GW	1	53,19934	143,28519	2324
15.IX	7	23	GW	1	53,18302	143,2639	597
15.IX	7	6,5	GW	1	53,18712	143,28123	1817
15.IX	7	6	GW	1	53,18497	143,28458	1993
15.IX	7	5	GW	1	53,18115	143,2902	2284
15.IX	7	6	GW	3	53,18032	143,28592	1986
15.IX	7	20	GW	1	53,17749	143,26625	639
15.IX	9	1,5	GW	1	53,15616	143,26346	43
15.IX	9	0,5	GW	1	53,17581	143,26524	464
15.IX	9	2	GW	1	53,15166	143,26833	295
15.IX	9	1	GW	1	53,16347	143,27202	722
15.IX	9	1	GW	1	53,16336	143,27538	942
15.IX	9	1	GW	1	53,16269	143,28313	1444
15.IX	9	0,5	GW	1	53,17484	143,28733	1909
15.IX	9	1	GW	2	53,16282	143,28203	1373
15.IX	9	1,5	GW	1	53,15524	143,28429	1405
15.IX	9	2	GW	1	53,14996	143,28585	1426
15.IX	9	10	HP	1	53,1263	143,28356	909
15.IX	9	1	GW	1	53,09742	143,31494	2536
15.IX	9	1,5	GW	2	53,09998	143,30186	1711
15.IX	9	1	GW	1	53,09046	143,29855	1345
15.IX	11	0,5	GW	1	53,09973	143,29246	1207
15.IX	11	13	HP	2	53,05771	143,2898	421
15.IX	11	2,5	GW	1	53,06843	143,30829	1802
15.IX	11	2	GW	1	53,0677	143,31673	2351
15.IX	11	3	GW	1	53,0584	143,31456	2072
15.IX	11	3	GW	1	53,0542	143,31602	2108
15.IX	11	2	GW	1	53,04295	143,32237	2366
15.IX	11	2,5	GW	1	53,04089	143,31457	1818
15.IX	11	2	GW	1	53,03059	143,30338	927
15.IX	11	1,5	GW	1	53,02598	143,30449	934
15.IX	11	1,5	GW	1	53,02578	143,30372	880
15.IX	11	1,5	GW	1	53,02619	143,30526	988
15.IX	11	1,5	GW	1	53,02664	143,30677	1094
15.IX	13	10	GW	1	52,98298	143,30479	306
15.IX	13	2	GW	1	53,00158	143,31565	1297
15.IX	13	1,5	GW	1	53,00492	143,32437	1925
15.IX	13	4	GW	1	52,98764	143,32246	1547
15.IX	13	3,5	GW	1	52,98918	143,32404	1674
15.IX	13	5	GW	1	52,98322	143,3229	1511
16.IX	7	6	GW	1	53,16736	143,27796	1202
16.IX	7	2	GW	1	53,15127	143,29593	2054
16.IX	7	5	GW	1	53,16586	143,28156	1408
15.IX	5	9	GW	1	53,28461	143,23645	1131
15.IX	5	9,5	GW	1	53,28354	143,23724	1156
15.IX	5	9	GW	1	53,28417	143,23889	1278
15.IX	5	8	GW	1	53,28637	143,23867	1319
15.IX	5	2,5	GW	1	53,30826	143,26818	3780
15.IX	5	1,5	GW	1	53,31878	143,28655	5234
15.IX	5	5,5	GW	1	53,28458	143,26599	3046
15.IX	13	3	GW	1	52,95966	143,32944	1604
15.IX	13	1,5	GW	1	52,94466	143,32752	1258
15.IX	15	3	GW	1	52,89494	143,33438	1180
15.IX	15	1,5	GW	1	52,86302	143,34397	1292
15.IX	15	1,5	GW	1	52,86006	143,33556	685
15.IX	15	1,5	GW	2	52,86041	143,33683	775
16.IX	1	0,5	GW	1	53,37835	143,24197	4405
16.IX	1	2	GW	1	53,39754	143,20487	2750
16.IX	1	1	GW	1	53,41105	143,23439	5083
16.IX	3	1,5	GW	2	53,28992	143,2318	852
16.IX	3	1,5	GW	1	53,29069	143,23442	1043
16.IX	3	2	GW	2	53,29987	143,23783	1550
16.IX	3	1	GW	3	53,30279	143,28044	4356
16.IX	3	1	GW	5	53,31895	143,2926	5642
16.IX	3	2	GW	1	53,32274	143,26535	4026
16.IX	3	6	GW	1	53,33341	143,23175	2223
16.IX	3	23	GW	1	53,33595	143,20787	782
16.IX	3	18	GW	1	53,33941	143,20916	973
16.IX	3	1,5	GW	1	53,381	143,22967	3594
16.IX	3	1,5	GW	1	53,38358	143,21725	2884
16.IX	3	0,5	GW	1	53,40923	143,22852	4412
16.IX	3	0,5	GW	1	53,41041	143,21979	3893
16.IX	5	1,5	GW	1	53,2022	143,2671	1056
16.IX	5	1	GW	1	53,19209	143,27855	1545
16.IX	5	1	GW	1	53,19321	143,28268	1841
16.IX	5	4	GW	1	53,22759	143,25176	697
16.IX	5	1	GW	1	53,19264	143,28062	1693
16.IX	5	14	GW	1	53,24996	143,24088	551
16.IX	5	7,5	GW	1	53,24401	143,25377	1238
16.IX	5	0,5	GW	1	53,19144	143,33672	5300
16.IX	5	2,5	GW	1	53,22816	143,28891	3120
16.IX	5	2,5	GW	1	53,22752	143,28787	3036
16.IX	5	16	GW	2	53,25688	143,24723	1136
16.IX	5	7,5	GW	1	53,25139	143,26401	2087
16.IX	5	9	GW	1	53,26774	143,26303	2432
16.IX	5	2,5	GW	1	53,28201	143,30674	5623
16.IX	5	4,5	GW	1	53,27233	143,28538	3996
16.IX	5	3	GW	1	53,28243	143,29746	5032
16.IX	5	3,5	GW	3	53,28657	143,28601	4393
16.IX	5	2	GW	2	53,29495	143,30735	5986
16.IX	5	3	GW	3	53,29389	143,28511	4518
16.IX	5	2	GW	2	53,31005	143,28315	4795
16.IX	5	4,5	GW	1	53,29188	143,26391	3093
16.IX	5	12	GW	1	53,27843	143,24388	1458
16.IX	5	13	GW	1	53,27658	143,24476	1469
16.IX	5	1	GW	1	53,33403	143,28145	5285
16.IX	5	1,5	GW	3	53,32112	143,27996	4865
16.IX	5	15	GW	3	53,27743	143,2333	747
16.IX	5	4,5	GW	1	53,29821	143,24241	1858
16.IX	5	2	GW	1	53,32036	143,21498	634
16.IX	7	2,5	GW	1	53,15261	143,28656	1467
16.IX	7	2,5	GW	1	53,15327	143,28811	1582
16.IX	7	25	HP	2	53,17506	143,26063	222
16.IX	7	6	GW	1	53,16564	143,27491	967
18.IX	7	0,5	GW	1	53,24672	143,24742	809
18.IX	7	1	GW	1	53,23167	143,25994	1324
18.IX	7	1	GW	1	53,23162	143,26145	1422

16.IX	7	4,5	GW	1	53,17662	143,29266	2353
16.IX	7	4,5	GW	1	53,18243	143,29269	2473
16.IX	7	3,5	GW	1	53,18296	143,2996	2937
16.IX	7	1,5	GW	1	53,18733	143,3268	4808
16.IX	7	1,5	GW	1	53,191	143,3254	4791
16.IX	7	2,5	GW	1	53,18877	143,30816	3616
16.IX	7	5	GW	1	53,18907	143,28646	2199
16.IX	7	3,5	GW	1	53,19373	143,29313	2731
16.IX	7	4,5	GW	1	53,1937	143,28459	2170
16.IX	7	6,5	GW	1	53,19102	143,27679	1605
16.IX	7	3,5	GW	1	53,19807	143,28741	2444
16.IX	7	2,5	GW	1	53,20646	143,28687	2579
16.IX	7	1	GW	1	53,22442	143,30024	3819
16.IX	7	1	GW	1	53,22488	143,29893	3743
16.IX	7	1	GW	2	53,22696	143,29218	3342
16.IX	7	1	GW	2	53,22657	143,29356	3425
16.IX	7	1	GW	1	53,23024	143,27644	2377
16.IX	7	0,5	GW	1	53,24613	143,27283	2462
16.IX	7	0,5	GW	1	53,24668	143,26504	1963
16.IX	7	0,5	GW	1	53,24683	143,26113	1710
16.IX	7	1,5	GW	1	53,22247	143,24668	268
16.IX	7	1	GW	3	53,23164	143,25083	727
16.IX	9	1	GW	1	53,09476	143,30989	2161
16.IX	9	4	GW	1	53,128	143,29784	1879
16.IX	9	3,5	GW	1	53,13379	143,2974	1939
16.IX	9	6	GW	1	53,13619	143,27911	768
16.IX	9	0,5	GW	1	53,17501	143,28587	1816
16.IX	9	5	GW	2	53,13901	143,27496	537
16.IX	9	0,5	GW	1	53,17579	143,2756	1149
16.IX	11	1,5	GW	1	53,07816	143,30707	1862
16.IX	11	1,5	GW	1	53,07792	143,30781	1908
16.IX	13	0,5	GW	1	52,9262	143,34159	1925
16.IX	13	25	HP	3	52,97813	143,30338	142
16.IX	15	0,5	GW	1	52,8477	143,35452	1741
16.IX	15	1,5	GW	2	52,86648	143,35005	1752
16.IX	15	1	GW	2	52,90869	143,34281	1966
16.IX	15	10	GW	2	52,88795	143,32226	261
18.IX	3	5,5	GW	1	53,33132	143,23368	2280
18.IX	5	3	GW	1	53,30897	143,21471	331
18.IX	5	7,5	GW	1	53,2871	143,24133	1510
18.IX	5	2,5	GW	2	53,30099	143,28509	4694
18.IX	5	13	GW	1	53,27639	143,24514	1489
18.IX	5	7,5	GW	1	53,27832	143,26102	2567
18.IX	5	7,5	GW	2	53,2649	143,2691	2755
18.IX	5	7,5	GW	3	53,26227	143,26912	2690
18.IX	5	2,5	GW	1	53,24456	143,30652	4672
18.IX	5	2,5	GW	1	53,23437	143,29738	3824
18.IX	5	9	GW	2	53,251	143,25723	1637
18.IX	5	4	GW	1	53,23975	143,27845	2731
18.IX	5	9	GW	1	53,2478	143,25271	1264
18.IX	7	2,5	GW	1	53,15506	143,29182	1861
19.IX	5	2,5	GW	1	53,22027	143,27281	1878
19.IX	5	3	GW	1	53,22676	143,2739	2112
19.IX	5	6	GW	2	53,23934	143,25571	1247
19.IX	5	25	GW	2	53,25742	143,2389	609
19.IX	5	3,5	GW	1	53,23829	143,28361	3029
19.IX	5	5	GW	1	53,24116	143,26899	2154
19.IX	5	4	GW	1	53,24028	143,27913	2789
19.IX	5	2,5	GW	3	53,25309	143,3108	5163
19.IX	5	13	GW	1	53,26761	143,25443	1871
19.IX	5	4	GW	1	53,27498	143,28904	4300
19.IX	5	18	GW	1	53,26866	143,24648	1382
19.IX	5	3	GW	1	53,30352	143,26538	3480
19.IX	5	2	GW	1	53,32073	143,22165	1075

18.IX	7	3,5	GW	1	53,20464	143,26998	1435
18.IX	7	4,5	GW	1	53,20056	143,26836	1246
18.IX	7	7,5	GW	1	53,19339	143,26643	974
18.IX	7	13	GW	1	53,18618	143,26833	952
18.IX	7	3	GW	1	53,20072	143,28951	2635
18.IX	7	3,5	GW	1	53,19934	143,28519	2324
18.IX	7	3,5	GW	1	53,19254	143,29431	2784
18.IX	7	3,5	GW	1	53,19213	143,29468	2800
18.IX	7	4,5	GW	2	53,18396	143,29227	2477
18.IX	7	3	GW	1	53,16833	143,3008	2719
18.IX	7	3,5	GW	1	53,16731	143,2949	2311
18.IX	9	1,5	GW	2	53,1564	143,26893	408
18.IX	9	7,5	GW	1	53,13504	143,27452	446
18.IX	9	7,5	GW	2	53,13512	143,27393	409
18.IX	9	1	GW	1	53,15968	143,29795	2377
18.IX	9	2,5	GW	1	53,14457	143,29108	1688
18.IX	9	1	GW	1	53,15625	143,30756	2959
18.IX	9	2,5	GW	1	53,14152	143,2974	2060
18.IX	9	3,5	GW	2	53,13203	143,29878	2004
18.IX	9	2,5	GW	2	53,13151	143,30735	2562
18.IX	9	2,5	GW	1	53,11907	143,30764	2389
18.IX	9	2,5	GW	1	53,11637	143,30616	2249
18.IX	9	5,5	GW	1	53,11439	143,28357	725
18.IX	11	2	GW	1	53,07704	143,28582	438
18.IX	11	1	GW	3	53,08628	143,30366	1754
18.IX	11	1,5	GW	1	53,07862	143,30556	1769
18.IX	11	1	GW	1	53,02193	143,31548	1603
18.IX	11	1	GW	1	53,0213	143,31369	1476
18.IX	11	9	GW	1	53,04581	143,29243	422
18.IX	13	4	GW	3	52,98785	143,32207	1524
18.IX	13	3	GW	2	52,99291	143,32188	1585
18.IX	15	3,5	GW	2	52,8747	143,33911	1161
18.IX	15	1,5	GW	2	52,86205	143,34169	1125
19.IX	1	0,5	GW	2	53,35633	143,20137	1076
19.IX	1	2	GW	4	53,38334	143,18365	915
19.IX	1	2	GW	2	53,41687	143,21013	3763
19.IX	1	6,5	GW	1	53,42751	143,15982	975
19.IX	3	1	GW	2	53,27861	143,22915	326
19.IX	3	1	GW	1	53,27795	143,22583	93
19.IX	3	1,5	GW	2	53,2911	143,23572	1139
19.IX	3	1,5	GW	1	53,29152	143,237	1234
19.IX	3	4,5	GW	1	53,32938	143,23897	2556
19.IX	3	0,5	GW	1	53,41064	143,21758	3760
19.IX	3	3,5	GW	2	53,36621	143,19934	1195
19.IX	3	1	GW	1	53,3935	143,17289	372
19.IX	5	0,5	GW	1	53,17214	143,28364	1376
19.IX	5	6	GW	2	53,23794	143,25209	977
19.IX	5	7,5	GW	1	53,24021	143,24311	452
19.IX	5	1	GW	1	53,19637	143,2927	2570
19.IX	5	2	GW	1	53,21158	143,26817	1360
19.IX	5	2,5	GW	2	53,2189	143,26896	1595
19.IX	11	1	GW	1	53,08817	143,28534	567
19.IX	13	1,5	GW	1	53,00245	143,33204	2398
19.IX	13	1	GW	1	53,01455	143,31349	1342
19.IX	13	1	GW	1	53,01509	143,30527	804
19.IX	15	0,5	GW	1	52,846	143,34941	1373
19.IX	15	0,5	GW	1	52,84807	143,35551	1813
22.IX	1	4,5	GW	1	53,42894	143,17331	1874
22.IX	3	5	GW	1	53,3145	143,21786	741
22.IX	3	9	GW	1	53,32558	143,21675	1020
22.IX	3	14	GW	1	53,33242	143,21356	1033
22.IX	3	13	GW	1	53,33336	143,21577	1203
22.IX	3	17	GW	1	53,33653	143,21158	1036
22.IX	3	13	GW	1	53,33544	143,216	1283

19.IX	7	5,5	GW	1	53,16178	143,26803	438
19.IX	7	1,5	GW	1	53,14267	143,29331	1707
19.IX	7	1,5	GW	2	53,14522	143,29954	2168
19.IX	7	1,5	GW	1	53,14615	143,30152	2316
19.IX	7	1,5	GW	1	53,15085	143,30969	2947
19.IX	7	3	GW	1	53,16339	143,29639	2329
19.IX	7	3	GW	1	53,16786	143,30047	2687
19.IX	7	0,5	GW	1	53,15255	143,35868	6193
19.IX	7	20	HP	5	53,1776	143,26631	645
19.IX	7	5	GW	2	53,18187	143,29009	2291
19.IX	7	4,5	GW	2	53,19309	143,28539	2211
19.IX	7	9	GW	1	53,18755	143,27325	1302
19.IX	7	2	GW	3	53,2046	143,30168	3512
19.IX	7	0,5	GW	1	53,23624	143,31651	5125
19.IX	7	0,5	GW	2	53,23807	143,31148	4833
19.IX	7	7,5	GW	1	53,1935	143,26602	949
19.IX	7	1,5	GW	1	53,22277	143,25924	1098
19.IX	7	1,5	GW	1	53,22282	143,25672	934
19.IX	7	1,5	GW	2	53,22256	143,24793	352
19.IX	9	4	GW	1	53,11738	143,29529	1546
19.IX	9	4	GW	1	53,11686	143,29483	1508
19.IX	9	3	GW	1	53,11668	143,30165	1955
19.IX	9	3,5	GW	2	53,1254	143,30109	2054
19.IX	9	3,5	GW	1	53,13624	143,29476	1803
19.IX	9	3	GW	2	53,14016	143,29347	1778
19.IX	9	3	GW	1	53,13941	143,29476	1852
19.IX	9	1,5	GW	3	53,15281	143,29447	2040
19.IX	9	1	GW	3	53,16304	143,27983	1231
19.IX	9	1,5	GW	1	53,1564	143,27167	589
19.IX	9	1	GW	1	53,16344	143,27314	795
19.IX	9	1	GW	1	53,16341	143,27426	869
19.IX	9	1	GW	1	53,16348	143,2709	648
19.IX	11	1,5	GW	1	53,02578	143,30372	880
19.IX	11	2,5	GW	1	53,0412	143,3149	1845
19.IX	11	4	GW	1	53,05064	143,31018	1669
19.IX	11	4	GW	1	53,05038	143,31012	1661
19.IX	11	1	GW	1	53,05945	143,34288	3965
19.IX	11	1	GW	1	53,08516	143,3085	2058
19.IX	11	1	GW	1	53,08628	143,30366	1754
19.IX	11	2,5	GW	1	53,07366	143,28938	624
19.IX	11	0,5	GW	1	53,09995	143,28696	845
23.IX	3	1,5	GW	1	53,28765	143,2223	175
23.IX	3	1,5	GW	1	53,2903	143,23312	948
23.IX	3	1	GW	1	53,28144	143,24045	1135
23.IX	3	1,5	GW	1	53,29152	143,237	1234
23.IX	3	9	GW	1	53,32178	143,20962	445
23.IX	3	1,5	GW	1	53,29815	143,25239	2423
23.IX	3	14	GW	1	53,32795	143,20955	636
23.IX	3	14	GW	1	53,32809	143,20976	654
23.IX	3	4	GW	1	53,31774	143,23375	1855
23.IX	3	4	GW	1	53,31813	143,23425	1899
23.IX	3	4	GW	2	53,32062	143,23703	2154
23.IX	3	15	GW	1	53,3298	143,21055	758
23.IX	3	1,5	GW	1	53,31912	143,27538	4550
23.IX	3	6,5	GW	1	53,32937	143,22836	1879
23.IX	3	20	GW	1	53,33383	143,20908	792
23.IX	3	24	GW	1	53,33555	143,20705	717
23.IX	3	7,5	GW	1	53,34115	143,22458	2011
23.IX	3	4	GW	1	53,34459	143,24103	3167
23.IX	3	19	GW	1	53,33997	143,20775	901
23.IX	3	14	GW	1	53,34285	143,20963	1112
23.IX	3	19	GW	1	53,34313	143,19998	506
23.IX	3	6	GW	1	53,3558	143,20569	1270
23.IX	5	3	GW	1	53,21941	143,2501	385
22.IX	3	12	GW	3	53,33768	143,21704	1421
22.IX	3	21	GW	1	53,33805	143,20775	841
22.IX	3	3	GW	1	53,35348	143,24449	3668
22.IX	3	3,5	GW	2	53,3569	143,23327	3061
22.IX	3	4	GW	1	53,36064	143,21743	2171
22.IX	3	1,5	GW	1	53,37949	143,23494	3882
22.IX	3	5	GW	1	53,3596	143,19434	667
22.IX	3	10	GW	2	53,34954	143,19459	366
22.IX	5	2,5	GW	1	53,21468	143,25257	426
22.IX	5	8	GW	1	53,241	143,24105	338
22.IX	5	2	GW	1	53,21075	143,26511	1141
22.IX	5	4	GW	2	53,23143	143,26369	1566
22.IX	5	2,5	GW	1	53,22176	143,27652	2156
22.IX	5	27	GW	1	53,26227	143,24172	914
22.IX	5	2,5	GW	1	53,31263	143,25028	2729
22.IX	5	6	GW	1	53,29299	143,22691	722
22.IX	5	3,5	GW	1	53,30552	143,22434	870
22.IX	5	3	GW	1	53,30909	143,21604	420
22.IX	5	3,5	GW	1	53,30544	143,22189	708
22.IX	5	3	GW	1	53,30852	143,21074	63
22.IX	7	3	GW	1	53,15298	143,2759	775
22.IX	7	2,5	GW	1	53,15111	143,28252	1171
22.IX	7	3,5	GW	1	53,17515	143,29933	2760
22.IX	7	7	GW	1	53,18568	143,28059	1745
22.IX	7	5	GW	1	53,19153	143,28396	2085
22.IX	7	5	GW	1	53,19153	143,28396	2085
22.IX	7	5	GW	1	53,19211	143,28325	2050
22.IX	7	26	GW	1	53,18347	143,26159	455
22.IX	7	4	GW	1	53,19792	143,28214	2095
22.IX	7	2,5	GW	1	53,20474	143,29066	2792
22.IX	7	10	GW	1	53,18937	143,26755	966
22.IX	7	3	GW	1	53,20302	143,28497	2384
22.IX	7	4	GW	1	53,201	143,27458	1663
22.IX	7	8,5	GW	1	53,19283	143,26204	675
22.IX	7	8,5	GW	1	53,19289	143,26166	651
23.IX	1	0,5	GW	1	53,35401	143,19298	466
23.IX	1	0,5	GW	1	53,35444	143,19468	588
23.IX	1	0,5	GW	3	53,35684	143,20301	1197
23.IX	1	0,5	GW	1	53,35737	143,20463	1317
23.IX	1	0,5	GW	1	53,36028	143,21249	1914
23.IX	1	1	GW	1	53,4102	143,23433	5049
24.IX	1	1,5	GW	1	53,39632	143,21454	3315
24.IX	1	3,5	GW	1	53,39894	143,18683	1665
24.IX	1	1	GW	1	53,37325	143,2011	1656
24.IX	1	1	GW	1	53,37089	143,19518	1200
24.IX	1	1,5	GW	1	53,37776	143,18679	915
24.IX	1	0,5	GW	1	53,35737	143,20463	1317
24.IX	1	1,5	GW	1	53,37741	143,18577	839
24.IX	1	3	GW	1	53,38827	143,17282	408
24.IX	1	1	GW	1	53,36884	143,18893	735
24.IX	1	2	GW	1	53,38106	143,17655	388
24.IX	3	2	GW	4	53,37797	143,18552	686
24.IX	3	5	GW	1	53,35955	143,19291	575
24.IX	3	4,5	GW	1	53,36148	143,19729	914
24.IX	3	2	GW	1	53,37827	143,20191	1740
24.IX	3	5	GW	1	53,35902	143,20498	1327
24.IX	3	3	GW	1	53,36523	143,22354	2705
24.IX	3	1,5	GW	1	53,37254	143,25174	4732
24.IX	3	7	GW	1	53,33361	143,22783	1979
24.IX	3	7	GW	1	53,33327	143,22778	1966
24.IX	3	7	GW	1	53,3346	143,22793	2017
24.IX	3	3,5	GW	1	53,31216	143,23104	1506
24.IX	3	1,5	GW	1	53,28992	143,2318	852
24.IX	3	1	GW	1	53,28144	143,24045	1135

23.IX	5	3,5	GW	1	53,22638	143,26054	1236
23.IX	5	1,5	GW	2	53,20914	143,28911	2657
23.IX	5	4	GW	1	53,23069	143,2618	1425
23.IX	5	18	GW	1	53,25348	143,23941	544
23.IX	5	2	GW	1	53,22528	143,29879	3688
23.IX	5	40	GW	1	53,26094	143,23631	530
23.IX	5	2	GW	1	53,24131	143,31567	5183
23.IX	5	10	GW	1	53,258	143,25959	1965
23.IX	5	7,5	GW	1	53,26095	143,26896	2647
23.IX	5	10	GW	1	53,28128	143,24282	1461
23.IX	5	3,5	GW	1	53,30002	143,26205	3176
23.IX	5	4,5	GW	1	53,2985	143,24038	1733
23.IX	5	3	GW	1	53,30953	143,2308	1389
23.IX	5	2	GW	1	53,3208	143,23002	1620
23.IX	5	1,5	GW	1	53,32851	143,2113	599
23.IX	5	2,5	GW	1	53,314	143,21484	466
23.IX	5	1,5	GW	1	53,32866	143,2132	726
23.IX	5	1,5	GW	1	53,32891	143,21702	980
23.IX	7	2	GW	1	53,14602	143,28233	1056
23.IX	7	5	GW	1	53,16362	143,27766	1107
23.IX	7	9	GW	1	53,17784	143,27753	1386
23.IX	7	2	GW	1	53,18878	143,3159	4123
23.IX	7	2	GW	1	53,1894	143,31563	4118
23.IX	7	4	GW	1	53,19819	143,2816	2065
23.IX	7	1	GW	1	53,22193	143,30659	4185
23.IX	7	5	GW	1	53,19916	143,26689	1121
23.IX	7	2	GW	2	53,21553	143,27157	1759
23.IX	7	1,5	GW	1	53,22243	143,2655	1502
24.IX	1	9	GW	1	53,42043	143,1679	1233
24.IX	1	7,5	GW	3	53,40756	143,17462	1202
24.IX	1	4	GW	1	53,40461	143,18773	1922
24.IX	9	2	GW	1	53,10653	143,30229	1841
24.IX	9	1,5	GW	1	53,09871	143,29888	1494
24.IX	11	1,5	GW	1	53,02598	143,30449	934
24.IX	13	2	GW	1	53,00143	143,31644	1347
24.IX	13	4	GW	1	52,9858	143,32533	1711
24.IX	15	1,5	GW	1	52,90517	143,33191	1184
24.IX	15	4,5	GW	1	52,87651	143,3363	1005
27.IX	1	4	GW	1	53,42131	143,18709	2471
27.IX	1	1,5	GW	1	53,42106	143,21868	4449
27.IX	3	1,5	GW	1	53,38501	143,18824	1081
27.IX	3	7,5	GW	1	53,35259	143,20418	1073
27.IX	3	5	GW	1	53,3572	143,21374	1827
27.IX	3	13	GW	1	53,34396	143,20956	1142
27.IX	3	15	GW	1	53,34108	143,20996	1077
27.IX	3	10	GW	1	53,33799	143,21962	1594
27.IX	3	4	GW	1	53,31774	143,23375	1855
27.IX	3	2	GW	1	53,30422	143,24657	2244
27.IX	3	13	GW	1	53,32506	143,20668	362
27.IX	3	1,5	GW	2	53,29152	143,237	1234
27.IX	3	6	GW	1	53,31648	143,21354	528
27.IX	5	5	GW	2	53,29675	143,22102	435
27.IX	5	3,5	GW	1	53,30551	143,23049	1267
27.IX	5	13	GW	1	53,27499	143,24764	1616
27.IX	5	13	GW	1	53,27477	143,24797	1632
27.IX	5	6,5	GW	2	53,26019	143,2735	2922
27.IX	5	6,5	GW	1	53,25971	143,2734	2903
27.IX	5	7	GW	1	53,24519	143,25912	1615
27.IX	5	2,5	GW	1	53,22125	143,2753	2064
28.IX	1	3,5	GW	1	53,43689	143,1511	758
28.IX	1	2,5	GW	2	53,38975	143,18625	1305
28.IX	1	2	GW	1	53,384	143,18534	1044
28.IX	1	4,5	GW	1	53,39477	143,17011	467
28.IX	3	1,5	GW	1	53,38456	143,18243	698
24.IX	3	1	GW	1	53,2829	143,2451	1477
24.IX	5	1,5	GW	1	53,32851	143,2113	599
24.IX	5	2,5	GW	1	53,314	143,21484	466
24.IX	5	0,5	GW	1	53,35979	143,20367	887
24.IX	5	1,5	GW	1	53,32833	143,20941	472
24.IX	5	4	GW	1	53,30186	143,23585	1524
24.IX	5	17	GW	1	53,27134	143,24513	1362
24.IX	5	14	GW	1	53,26723	143,25198	1703
24.IX	5	13	GW	1	53,25806	143,25381	1592
24.IX	5	13	GW	1	53,25778	143,25365	1575
24.IX	5	1	GW	1	53,23599	143,34868	7190
24.IX	5	1,5	GW	1	53,23914	143,3293	6013
24.IX	5	17	GW	1	53,25726	143,2469	1124
24.IX	5	2	GW	1	53,23245	143,3079	4458
24.IX	5	3	GW	1	53,2413	143,29482	3831
24.IX	7	2,5	GW	1	53,21134	143,26875	1490
24.IX	7	0,5	GW	1	53,2447	143,28434	3188
24.IX	7	2,5	GW	2	53,21134	143,26875	1490
24.IX	7	5	GW	1	53,19735	143,27343	1513
24.IX	7	4	GW	1	53,20119	143,27396	1625
24.IX	7	1,5	GW	1	53,2138	143,29994	3584
24.IX	7	2,5	GW	1	53,186	143,3093	3634
24.IX	7	1,5	GW	1	53,14267	143,29331	1707
24.IX	7	1,5	GW	1	53,14228	143,29223	1629
24.IX	7	2,5	GW	2	53,15229	143,28577	1408
24.IX	7	1	GW	1	53,13328	143,29573	1676
24.IX	9	2	GW	1	53,15069	143,28216	1194
24.IX	9	1,5	GW	1	53,15438	143,28863	1679
24.IX	9	3,5	GW	1	53,13464	143,29659	1899
24.IX	9	3,5	GW	1	53,13408	143,29714	1927
24.IX	9	3	GW	2	53,12401	143,30451	2258
28.IX	15	2	GW	1	52,88891	143,35149	2217
28.IX	15	3	GW	1	52,88603	143,34464	1715
28.IX	15	3	GW	1	52,88336	143,34536	1719
28.IX	15	1,5	GW	1	52,86229	143,34227	1167
29.IX	1	2	GW	1	53,38302	143,1828	850
29.IX	1	2,5	GW	1	53,38636	143,17836	689
29.IX	1	1,5	GW	2	53,37887	143,18979	1143
29.IX	1	2,5	GW	1	53,38907	143,1849	1196
29.IX	1	11	GW	1	53,40532	143,16578	567
29.IX	1	3	GW	1	53,40563	143,19658	2515
29.IX	1	5	GW	1	53,41814	143,1832	2115
29.IX	1	6	GW	1	53,42365	143,17333	1688
29.IX	1	1,5	GW	1	53,44743	143,18618	3336
29.IX	3	1,5	GW	1	53,29195	143,23827	1328
29.IX	3	3	GW	1	53,30903	143,2331	1538
29.IX	3	14	GW	1	53,33133	143,21298	962
29.IX	3	15	GW	1	53,34253	143,2086	1036
29.IX	3	4	GW	2	53,36367	143,19573	885
29.IX	3	1,5	GW	2	53,38498	143,20431	2104
29.IX	3	5	GW	1	53,3596	143,19434	667
29.IX	3	4	GW	1	53,36363	143,19323	724
29.IX	3	3,5	GW	1	53,36609	143,19026	613
29.IX	5	1,5	GW	1	53,20307	143,27065	1308
29.IX	5	1,5	GW	2	53,20451	143,27587	1682
29.IX	5	1,5	GW	1	53,20727	143,28427	2296
29.IX	5	35	GW	1	53,25811	143,23423	324
29.IX	5	1	GW	1	53,19927	143,30037	3139
29.IX	5	5	GW	1	53,2368	143,26111	1534
29.IX	5	2	GW	1	53,2268	143,30098	3868
29.IX	5	7,5	GW	1	53,24915	143,2617	1881
29.IX	5	6	GW	2	53,25496	143,27448	2854
29.IX	5	6	GW	1	53,25797	143,2757	3009
29.IX	5	7,5	GW	1	53,27175	143,26681	2778

28.IX	3	1,5	GW	1	53,38521	143,19408	1460
28.IX	3	12	GW	1	53,34798	143,19512	350
28.IX	3	4	GW	1	53,36367	143,1949	831
28.IX	3	4	GW	1	53,36342	143,20238	1300
28.IX	3	9	GW	1	53,34723	143,21275	1449
28.IX	3	14	GW	1	53,3396	143,2132	1237
28.IX	5	20	GW	1	53,2641	143,246	1237
28.IX	5	13	GW	1	53,2612	143,25504	1751
28.IX	5	7,5	GW	1	53,25581	143,26718	2403
28.IX	5	11	GW	1	53,25309	143,25313	1424
28.IX	5	5	GW	1	53,23752	143,26265	1651
28.IX	5	3,5	GW	1	53,22996	143,26983	1927
28.IX	5	6	GW	1	53,23557	143,24349	361
28.IX	7	3,5	GW	1	53,206	143,2533	369
28.IX	9	15	HP	4	53,12957	143,27582	448
28.IX	9	2,5	GW	1	53,1434	143,29384	1853
28.IX	11	5	GW	1	53,04034	143,29287	372
28.IX	13	2,5	GW	1	52,99546	143,32375	1746
28.IX	13	1,5	GW	1	52,94521	143,32922	1380
28.IX	13	1	GW	1	52,93809	143,33315	1537
28.IX	13	1	GW	1	52,93746	143,33103	1387
29.IX	11	1,5	GW	1	53,02966	143,31456	1654
29.IX	11	0,5	GW	1	53,01675	143,33678	2940
29.IX	11	1	GW	2	53,08766	143,29462	1175
29.IX	11	4,5	GW	1	53,0666	143,28613	306
29.IX	13	1	GW	2	52,93912	143,33626	1758
29.IX	13	3	GW	1	52,96274	143,33326	1902
29.IX	13	2	GW	1	52,9959	143,33287	2358
29.IX	13	1,5	GW	1	53,00391	143,32786	2142
29.IX	15	0,5	GW	1	52,84734	143,35352	1668
29.IX	15	1,5	GW	1	52,89326	143,35526	2539
29.IX	15	2	GW	1	52,89687	143,34299	1783
29.IX	15	1,5	GW	2	52,90226	143,34192	1801
29.IX	15	1,5	GW	2	52,90202	143,3425	1836
29.IX	15	0,5	GW	2	52,92125	143,33674	1769
30.IX	1	6	GW	1	53,40636	143,1786	1410
30.IX	1	4,5	GW	1	53,40081	143,18104	1367
30.IX	1	1	GW	1	53,37134	143,19639	1292
30.IX	1	0,5	GW	2	53,35737	143,20463	1317
30.IX	1	3,5	GW	1	53,39041	143,17025	322
30.IX	1	2	GW	1	53,38185	143,17928	587
30.IX	1	3	GW	1	53,3887	143,17423	512
30.IX	1	1	GW	1	53,36812	143,18635	547
30.IX	1	1	GW	1	53,36511	143,17153	-491
30.IX	1	4	GW		53,43427	143,14477	268
30.IX	1	1	GW		53,46117	143,15089	1602
30.IX	1	15	MW		53,41881	143,16035	702
30.IX	3	1	GW	3	53,39432	143,17976	836
30.IX	3	4	GW	1	53,36344	143,18991	507
30.IX	3	5	GW	1	53,35954	143,19934	984
30.IX	3	23	GW	1	53,32901	143,20201	189
30.IX	3	3	GW	2	53,30283	143,21495	186
30.IX	3	2,5	GW	1	53,30361	143,23203	1299
30.IX	3	4,5	GW	1	53,31178	143,21619	549
30.IX	5	5	GW	1	53,29651	143,21812	241
30.IX	5	3,5	GW	1	53,30527	143,23538	1579
30.IX	5	5	GW	1	53,29519	143,24513	1958
30.IX	5	7,5	GW	1	53,2871	143,24133	1510
30.IX	5	2,5	GW	1	53,31184	143,25455	2986
30.IX	5	19	GW	1	53,27338	143,23866	993
30.IX	5	13	GW	1	53,27561	143,2466	1564
30.IX	5	1	GW	1	53,25708	143,35663	8233
30.IX	5	1	GW	1	53,26928	143,3567	8543
30.IX	5	4	GW	1	53,30205	143,22118	578

29.IX	5	14	GW	1	53,26995	143,25123	1722
29.IX	5	15	GW	1	53,27372	143,24417	1359
29.IX	5	4	GW	1	53,29921	143,25218	2516
29.IX	5	18	GW	1	53,2759	143,2311	567
29.IX	5	1	GW	1	53,34012	143,20618	558
29.IX	7	0,5	GW	1	53,115	143,28736	757
29.IX	7	2	GW	2	53,14928	143,29166	1733
29.IX	7	7,5	GW	1	53,17096	143,27667	1190
29.IX	7	7	GW	1	53,18301	143,28197	1782
29.IX	7	6	GW	1	53,18436	143,28488	2000
29.IX	7	4,5	GW	1	53,19309	143,28539	2211
29.IX	7	3,5	GW	1	53,19903	143,28576	2355
29.IX	7	1	GW	1	53,22488	143,29893	3743
29.IX	7	1	GW	1	53,22897	143,28373	2829
29.IX	7	1	GW	1	53,22836	143,28658	3004
29.IX	7	1	GW	1	53,23098	143,27049	2002
29.IX	7	0,5	GW	2	53,24662	143,24547	679
29.IX	9	1	GW	1	53,09108	143,30054	1486
29.IX	9	1	GW	1	53,16314	143,27872	1159
29.IX	9	1	GW	1	53,16322	143,27761	1087
29.IX	9	0,5	GW	1	53,17564	143,27855	1341
30.IX	3	2,5	GW	1	53,37334	143,19341	1042
30.IX	3	2,5	GW	1	53,37326	143,19118	898
30.IX	3	2,5	GW	1	53,37333	143,19899	1397
30.IX	3	18	GW	1	53,34389	143,19927	485
30.IX	3	35	GW	1	53,33445	143,20385	478
30.IX	3	4	GW	1	53,32192	143,23825	2273
30.IX	3	7,5	GW	1	53,32732	143,22329	1491
30.IX	3	9	GW	1	53,32454	143,21527	893
30.IX	3	1,5	GW	1	53,29152	143,237	1234
30.IX	3	1	GW	2	53,28099	143,23887	1020
30.IX	1	3,5	GW	1	53,43044	143,18052	2381
30.IX	1	6,5	GW	1	53,40453	143,17524	1134
30.IX	1	3	GW	1	53,3956	143,18811	1628
30.IX	1	1	GW	1	53,36777	143,18505	453
1.X	1	8,5	GW	1	53,42383	143,15436	498
1.X	1	2	GW	1	53,44182	143,17238	2266
1.X	1	14	GW	1	53,41396	143,16502	820
1.X	1	1,5	GW	1	53,38392	143,19204	1459
1.X	1	1	GW	1	53,37587	143,19631	1443
1.X	1	1	GW	1	53,37192	143,18498	591
1.X	3	0,5	GW	1	53,40946	143,16887	622
1.X	3	3,5	GW	1	53,36538	143,18682	372
1.X	3	1	GW	1	53,39414	143,18339	1062
1.X	3	1,5	GW	1	53,38475	143,19421	1454
1.X	3	3	GW	1	53,35413	143,24332	3615
1.X	3	4	GW	1	53,34703	143,23908	3120
1.X	3	0,5	GW	1	53,2659	143,25072	1299
1.X	3	0,5	GW	1	53,26648	143,25273	1445
1.X	3	0,5	GW	1	53,26204	143,23411	119
1.X	5	6	GW	2	53,23855	143,2612	1583
1.X	7	2	GW	1	53,21716	143,25438	668
1.X	7	2,5	GW	2	53,15166	143,28527	1366
1.X	9	0,5	GW	1	53,16701	143,28083	1360
1.X	11	1	GW	1	53,06137	143,34163	3938
1.X	11	0,5	GW	1	53,0452	143,36167	5032
1.X	11	0,5	GW	1	53,03644	143,35771	4642
1.X	11	0,5	GW	1	53,01929	143,33904	3155
1.X	13	0,5	GW	1	53,02297	143,30163	978
1.X	13	0,5	GW	2	53,0165	143,33861	3340
1.X	13	2	GW	1	52,9542	143,32672	1646
1.X	15	0,5	GW	1	52,92511	143,34185	2478
1.X	15	0,5	GW	1	52,92615	143,33702	2175
1.X	15	1	GW	2	52,91149	143,34513	2472

30.IX	5	4	GW	1	53,30221	143,22796	1021
30.IX	5	16	GW	1	53,27633	143,23488	822
30.IX	5	10	GW	1	53,28264	143,23741	1144
30.IX	5	16	GW	1	53,27607	143,236	888
30.IX	5	16	GW	2	53,27676	143,2347	822
30.IX	5	1,5	GW	3	53,23808	143,32857	5939
30.IX	5	5	GW	1	53,2403	143,26767	2046
30.IX	5	2	GW	1	53,22169	143,29296	3220
30.IX	3	2,5	GW	1	53,37275	143,18454	459
30.IX	3	1	GW	1	53,39448	143,18149	951
30.IX	3	1,5	GW	1	53,38492	143,18678	986
4.X	3	4	GW	3	53,36353	143,20072	1198
4.X	3	4	GW	1	53,36366	143,1974	990
4.X	3	5	GW	1	53,35804	143,21045	1644
4.X	3	7,5	GW	1	53,34262	143,2236	1995
4.X	3	1	GW	1	53,34486	143,29503	6614
4.X	3	1,5	GW	1	53,28823	143,22506	369
4.X	5	1	GW	1	53,34051	143,21067	858
4.X	5	1	GW	1	53,34092	143,21743	1307
4.X	5	3	GW	1	53,30948	143,23215	1475
4.X	5	10	GW	1	53,2831	143,23457	972
4.X	5	10	GW	1	53,28293	143,23571	1041
4.X	5	7	GW	2	53,28801	143,24351	1674
4.X	5	25	GW	1	53,27149	143,23484	698
4.X	5	17	GW	1	53,27207	143,24416	1317
4.X	5	19	GW	1	53,26993	143,24366	1231
4.X	5	15	GW	1	53,27201	143,24664	1477
4.X	5	2,5	GW	1	53,27949	143,30825	5658
4.X	7	8,5	GW	1	53,193	143,26088	602
4.X	7	1,5	GW	1	53,21285	143,30191	3694
4.X	7	2,5	GW	2	53,15744	143,2959	2177
4.X	7	1	GW	2	53,13985	143,3121	2882
4.X	7	0,5	GW	1	53,11875	143,30384	1913
4.X	7	0,5	GW	1	53,11826	143,30206	1786
4.X	9	0,5	GW	1	53,17195	143,30286	2892
4.X	9	1	GW	1	53,15875	143,30093	2560
4.X	9	1,5	GW	2	53,14654	143,30824	2854
4.X	9	2	GW	1	53,13336	143,31237	2923
4.X	11	2	GW	1	53,04621	143,3242	2534
4.X	11	0,5	GW	1	53,02084	143,34363	3454
4.X	11	1,5	GW	1	53,03275	143,32012	2068
4.X	13	1	GW	1	53,0138	143,31927	1715
4.X	13	1	GW	1	52,93777	143,3321	1462
4.X	15	0,5	GW	1	52,91997	143,34341	2191
4.X	15	1	GW	1	52,86349	143,35846	2261
4.X	15	1	GW	1	52,86309	143,35791	2218
4.X	15	0,5	GW	1	52,85641	143,37124	2994
4.X	15	0,5	GW	1	52,84845	143,35649	1884
5.X	1	2,5	GW	1	53,38513	143,17444	399
5.X	1	3,5	GW	1	53,39722	143,18471	1472
5.X	1	7,5	GW	1	53,40689	143,17415	1149
5.X	1	0,5	GW	1	53,44438	143,24429	6882
5.X	1	16	GW	1	53,41867	143,1594	637
5.X	1	5	GW	1	53,42962	143,16657	1475
5.X	3	1,5	GW	1	53,28823	143,22506	369
5.X	3	2,5	GW	1	53,29958	143,21922	356
5.X	3	2,5	GW	1	53,30219	143,22826	1014
5.X	3	1	GW	1	53,28396	143,24812	1703
5.X	3	1,5	GW	1	53,29757	143,2513	2335
5.X	3	20	GW	1	53,33249	143,2085	713
5.X	3	18	GW	1	53,33355	143,21033	863
5.X	3	1	GW	1	53,3951	143,19545	1860
5.X	3	1	GW	2	53,39394	143,17631	604
5.X	5	4,5	GW	1	53,23564	143,26522	1771

1.X	15	1	GW	1	52,88356	143,36954	3633
1.X	15	1,5	GW	1	52,8827	143,35907	2924
1.X	15	1,5	GW	1	52,88176	143,35897	2902
1.X	15	1	GW	1	52,87013	143,36452	3080
1.X	15	1	GW	1	52,86195	143,35565	2356
1.X	15	0,5	GW	1	52,84969	143,3612	2523
4.X	1	0,5	GW	2	53,35849	143,20783	1558
4.X	1	1,5	GW	1	53,37776	143,18679	915
4.X	1	0,5	GW	1	53,35737	143,20463	1317
4.X	1	3	GW	2	53,3887	143,17423	512
4.X	3	4	GW	1	53,3633	143,18827	397
5.X	5	13	GW	1	53,27542	143,24564	1497
5.X	5	6	GW	1	53,28936	143,25089	2186
5.X	5	10	GW	1	53,28274	143,23685	1110
5.X	5	6,5	GW	1	53,2909	143,21883	146
5.X	7	1,5	GW	1	53,14021	143,28552	1147
5.X	7	1	GW	1	53,16203	143,33773	5011
5.X	7	1,5	MW	1	53,18359	143,32765	4788
5.X	7	4	GW	1	53,19678	143,2842	2208
5.X	9	0,5	GW	2	53,12614	143,35495	5625
5.X	9	1	GW	2	53,12987	143,33377	4283
5.X	9	1	GW	1	53,16145	143,29069	1925
5.X	9	1	GW	1	53,16341	143,27426	869
5.X	11	0	GW	1	53,15026	143,31536	3459
5.X	13	0	GW	1	52,86786	143,34063	1014
5.X	13	0	GW	1	52,86922	143,34984	1645
5.X	15	0,5	GW	1	52,84734	143,35352	1668
5.X	15	1	KW	1	52,8584	143,34981	1603
5.X	15	1	KW	1	52,86079	143,35439	1947
5.X	15	1,5	GW	2	52,87368	143,35713	2341
6.X	1	7,5	GW	1	53,4264	143,15425	586
6.X	1	14	GW	1	53,41563	143,16556	917
6.X	1	13	GW	1	53,4152	143,16734	1014
6.X	1	7,5	GW	1	53,41281	143,17612	1481
6.X	1	8,5	GW	1	53,40929	143,17319	1173
6.X	3	5	GW	2	53,35923	143,18866	294
6.X	3	1	GW	1	53,39414	143,17803	720
6.X	3	8	GW	1	53,35224	143,19232	306
6.X	3	8,5	GW	1	53,3514	143,19201	260
6.X	3	6	GW	1	53,35659	143,19704	745
6.X	3	5	GW	1	53,35846	143,20843	1529
6.X	3	13	GW	1	53,34512	143,20709	1022
6.X	3	9	GW	1	53,34631	143,21444	1528
6.X	3	7,5	GW	1	53,32157	143,21598	844
6.X	5	2,5	GW	1	53,31371	143,2119	268
6.X	5	2,5	GW	1	53,31354	143,21044	169
6.X	5	3,5	GW	1	53,30521	143,21823	465
6.X	5	0,5	GW	1	53,3526	143,29259	6472
6.X	5	0,5	GW	1	53,31403	143,36625	10282
6.X	5	14	GW	2	53,25891	143,25245	1525
6.X	5	5	GW	1	53,24116	143,26899	2154
6.X	5	5	GW	1	53,24073	143,26834	2100
6.X	7	3	GW	1	53,20758	143,26985	1485
6.X	7	4	GW	1	53,18798	143,29366	2649
6.X	7	3	GW	1	53,16055	143,29279	2036
6.X	7	2,5	GW	1	53,15544	143,29253	1915
6.X	7	3,5	GW	1	53,16068	143,28665	1636
6.X	7	5	GW	1	53,16036	143,26836	430
6.X	9	1,5	GW	1	53,15632	143,26619	226
6.X	9	0	GW	1	53,22973	143,27225	1763
6.X	9	1,5	GW	1	53,15457	143,28778	1625
6.X	9	3,5	GW	1	53,12734	143,30085	2068
6.X	11	0,5	GW	1	53,02023	143,34271	3383
6.X	11	0,5	GW	2	53,01903	143,3408	3240

5.X	5	4	GW	2	53,27368	143,28968	4308
6.X	13	2,5	GW	1	52,99199	143,33108	2182
6.X	13	2	GW	1	52,9942	143,33588	2533
6.X	13	4	GW	1	52,97881	143,3312	1999
6.X	13	1	GW	1	52,94189	143,34313	2255
6.X	15	0	GW	1	52,95655	143,39886	6474
6.X	15	2	GW	1	52,88195	143,35338	2228
6.X	15	1,5	GW	1	52,86648	143,35005	1752
6.X	15	1	GW	1	52,86042	143,35376	1900
7.X	1	0,5	GW	3	53,35684	143,20301	1197
7.X	1	8	GW	1	53,40351	143,16906	709
7.X	3	1	GW	1	53,28191	143,24201	1249
7.X	3	3,5	GW	1	53,30947	143,22534	1058
7.X	3	4	GW	1	53,31813	143,23425	1899
7.X	3	1	GW	1	53,37313	143,27365	6146
7.X	3	4	GW	2	53,36363	143,19323	724
7.X	3	4	GW	1	53,36365	143,19406	778
7.X	3	0,5	GW	1	53,40902	143,16214	178
7.X	5	2,5	GW	3	53,21806	143,26634	1404
7.X	5	22	GW	1	53,25578	143,23884	565
7.X	5	48	GW	1	53,26011	143,23366	337
7.X	5	6	GW	1	53,25349	143,27367	2765
7.X	5	18	GW	2	53,26826	143,24677	1391
7.X	5	20	GW	1	53,27147	143,24044	1061
7.X	5	0,5	GW	1	53,35762	143,26847	5034
7.X	5	11	GW	1	53,28151	143,23509	965
7.X	5	4	GW	1	53,30215	143,22344	727
7.X	5	1	GW	1	53,34012	143,20618	558
7.X	7	7,5	GW	1	53,16911	143,27416	988
7.X	7	5	GW	1	53,17163	143,28763	1922
7.X	7	3	GW	2	53,193	143,29915	3111
7.X	7	7,5	GW	1	53,1868	143,27815	1608
7.X	7	5	GW	1	53,18875	143,28673	2210
7.X	7	6,5	GW	1	53,19388	143,27114	1293
7.X	7	17	GW	1	53,18676	143,26109	489
7.X	7	0	GW	1	53,30865	143,24719	2049
7.X	7	0	GW	1	53,30862	143,26599	3281
7.X	9	0	GW	2	53,02805	143,33637	2878
7.X	9	1	GW	1	53,09017	143,29754	1274
7.X	9	0	GW	1	53,22676	143,31147	4309
7.X	11	0	GW	1	52,96035	143,34745	2829
7.X	13	0	GW	1	52,87029	143,3559	2063
7.X	13	1	GW	2	52,95112	143,35778	3362
7.X	13	0,5	GW	1	52,95981	143,38792	5490
7.X	13	1	GW	3	52,97029	143,36949	4418
7.X	13	1	GW	1	52,97242	143,36975	4466
7.X	13	5	GW	1	52,98042	143,32551	1644
7.X	13	5	GW	3	52,98255	143,32364	1551
7.X	13	1	GW	1	53,00662	143,34351	3220
7.X	13	1	GW	2	53,00788	143,34065	3048
7.X	13	1,5	GW	1	53,00146	143,33444	2543
7.X	13	1	GW	2	53,00905	143,33768	2868
7.X	15	0,5	GW	2	52,91499	143,3588	3131
8.X	1	1	GW	1	53,3718	143,19759	1383
8.X	1	6	GW	2	53,39895	143,16882	533
9.X	3	2	GW	1	53,29487	143,22229	403
9.X	3	4	GW	1	53,30984	143,21787	594
9.X	3	13	GW	2	53,32647	143,20971	600
9.X	3	3	GW	1	53,36937	143,19968	1316
9.X	3	1	GW	2	53,39432	143,17976	836
9.X	5	2	GW	1	53,22101	143,29173	3124
9.X	5	2,5	GW	1	53,22752	143,28787	3036
9.X	5	4	GW	2	53,3019	143,21894	428
9.X	7	1,5	GW	1	53,15085	143,30969	2947
6.X	13	0,5	GW	1	53,02781	143,29384	229
8.X	1	1,5	GW	2	53,37707	143,18474	762
8.X	3	1,5	GW	1	53,38367	143,17528	214
8.X	3	4,5	GW	3	53,36138	143,19191	569
8.X	3	9	GW	2	53,35002	143,2044	1005
8.X	3	13	GW	1	53,34241	143,21191	1243
8.X	3	13	GW	2	53,33951	143,21463	1325
8.X	3	25	GW	1	53,33644	143,20664	719
8.X	3	7,5	GW	1	53,32435	143,22028	1206
8.X	3	0,5	GW	1	53,26595	143,25078	1303
8.X	5	4	GW	2	53,30198	143,22006	503
8.X	5	2,5	GW	1	53,31445	143,22225	957
8.X	5	7,5	GW	1	53,28805	143,23569	1168
8.X	5	6	GW	1	53,24498	143,26571	2037
8.X	7	2,5	GW	1	53,21134	143,26875	1490
8.X	7	1	GW	1	53,20972	143,32682	5264
8.X	7	5	GW	1	53,17506	143,28945	2111
8.X	9	0	GW	2	53,0295	143,34196	3271
8.X	11	4	GW	1	53,06183	143,30509	1494
8.X	11	1	GW	1	53,05388	143,34399	3957
8.X	11	0,5	GW	1	53,02274	143,3463	3659
8.X	11	0,5	GW	1	53,02084	143,34363	3454
8.X	11	0,5	GW	1	53,00985	143,31964	1703
8.X	11	0	GW	2	52,95909	143,34206	2453
8.X	11	0	GW	1	52,95741	143,33386	1885
8.X	13	1	GW	2	53,00905	143,33768	2868
8.X	13	2,5	GW	1	52,99288	143,32951	2091
8.X	13	4	GW	1	52,9848	143,32661	1781
8.X	13	3,5	GW	1	52,96635	143,33231	1891
8.X	13	1,5	GW	1	52,94708	143,33413	1733
8.X	13	0	GW	2	52,87425	143,37367	3301
8.X	13	0,5	GW	1	52,9262	143,34159	1925
8.X	13	0	GW	1	52,86974	143,35288	1855
8.X	15	1,5	GW	1	52,90202	143,3425	1836
8.X	15	1,5	GW	1	52,89436	143,35425	2490
8.X	15	1,5	GW	1	52,89135	143,35672	2604
8.X	15	1,5	GW	3	52,88734	143,35879	2676
8.X	15	1	GW	1	52,86349	143,35846	2261
8.X	15	1	GW	1	52,86079	143,35439	1947
8.X	15	1	GW	1	52,86007	143,35313	1852
8.X	15	0	GW	1	52,79933	143,37056	2010
8.X	15	0,5	GW	1	52,87819	143,38634	4354
8.X	15	0,5	GW	1	52,87679	143,38607	4313
8.X	15	1	GW	1	52,87716	143,36863	3162
8.X	15	1	GW	1	52,87613	143,36831	3124
8.X	15	0	GW	1	52,79933	143,37056	2010
9.X	1	2,5	GW	1	53,38609	143,17759	631
9.X	1	3,5	GW	2	53,39141	143,17341	556
9.X	1	2	GW	1	53,38302	143,1828	850
9.X	1	1,5	GW	2	53,37966	143,19174	1293
9.X	1	2	GW	1	53,3847	143,18699	1173
9.X	1	2	GW	1	53,38506	143,1878	1236
9.X	1	0,5	GW	1	53,36649	143,22546	2949
9.X	1	4,5	GW	1	53,39884	143,17844	1134
9.X	1	2,5	GW	1	53,39236	143,19065	1673
10.X	9	4	GW	1	53,14188	143,26948	219
10.X	9	1	GW	1	53,09208	143,30346	1694
10.X	11	0,5	GW	1	53,0988	143,30199	1825
10.X	11	2,5	GW	1	53,04738	143,3192	2219
10.X	13	2	GW	1	52,99928	143,32476	1868
10.X	13	1	GW	2	52,94277	143,34499	2391
10.X	15	1,5	GW	1	52,90075	143,34528	1999
10.X	15	1,5	GW	1	52,894	143,3546	2507
10.X	15	3	GW	1	52,88858	143,34316	1659

9.X	7	5	GW	1	53,17541	143,28958	2127
9.X	7	5	GW	1	53,19637	143,27595	1658
9.X	7	3	GW	1	53,20871	143,25983	852
9.X	9	1,5	GW	1	53,10709	143,31318	2570
9.X	9	1,5	GW	1	53,14845	143,30496	2667
9.X	9	1	GW	1	53,15503	143,31024	3117
9.X	11	1	GW	4	53,0364	143,3377	3286
9.X	11	2,5	GW	2	53,0548	143,32	2380
9.X	11	2	GW	1	53,06374	143,32099	2575
9.X	11	2	GW	1	53,06411	143,32065	2559
9.X	11	1	GW	1	53,07047	143,33592	3663
9.X	13	0	GW	1	52,88025	143,39339	4698
9.X	13	2	GW	1	52,98467	143,34608	3072
9.X	13	2,5	GW	1	52,99007	143,33399	2347
9.X	13	2,5	GW	2	52,99316	143,32897	2059
9.X	13	0,5	GW	1	53,01901	143,35156	3934
9.X	13	1	GW	1	53,00942	143,33667	2806
9.X	13	1	GW	1	53,01341	143,32155	1860
9.X	15	1	GW	1	52,8584	143,34981	1603
9.X	15	2	GW	2	52,86386	143,33413	652
9.X	15	1	GW	2	52,88027	143,36924	3253
9.X	15	1	GW	1	52,88236	143,36934	3294
10.X	1	13	GW	1	53,4194	143,16271	871
10.X	1	14	GW	3	53,41823	143,16332	868
10.X	1	20	GW	1	53,41561	143,16136	652
10.X	1	5	GW	1	53,41358	143,18459	2041
10.X	1	13	GW	1	53,40912	143,16695	775
10.X	1	0,5	GW	1	53,38912	143,25126	5370
10.X	3	0	GW	1	53,47385	143,14108	885
10.X	3	0,5	GW	1	53,41025	143,17085	772
10.X	3	0	GW	1	53,47743	143,18224	3620
10.X	3	5	GW	2	53,35958	143,19362	621
10.X	3	7,5	GW	1	53,34847	143,21653	1729
10.X	3	3	GW	1	53,33236	143,25318	3554
10.X	3	3,5	GW	1	53,32886	143,247	3050
10.X	3	4	GW	1	53,3289	143,24255	2768
10.X	3	3,5	GW	1	53,32571	143,24561	2862
10.X	3	3,5	GW	1	53,32468	143,24503	2793
10.X	5	2	GW	1	53,32064	143,23503	1941
10.X	5	3	GW	1	53,29449	143,28421	4475
10.X	5	12	GW	1	53,25399	143,25279	1424
10.X	5	6,5	GW	1	53,24838	143,26642	2168
10.X	7	4	GW	1	53,17145	143,29381	2324
10.X	7	5	GW	1	53,16036	143,26836	430
10.X	7	1	GW	1	53,13071	143,28602	987
19.X	1	7,5	GW	1	53,40744	143,17214	1037
19.X	1	0	GW	1	53,3056	143,23004	1083
19.X	3	7,5	GW	1	53,35271	143,20066	853
19.X	3	16	GW	1	53,34174	143,20744	938
19.X	3	4	GW	2	53,33356	143,24358	2982
19.X	3	15	GW	4	53,33232	143,21259	969
19.X	3	23	GW	1	53,33117	143,20622	527
19.X	3	10	GW	1	53,32869	143,21772	1181
19.X	3	10	GW	1	53,32654	143,21558	977
19.X	3	1,5	GW	1	53,29687	143,25011	2238
19.X	3	1,5	GW	1	53,29577	143,24786	2060
19.X	3	5,5	GW	2	53,31681	143,21918	898
19.X	3	3,5	GW	1	53,30962	143,22608	1111
19.X	3	0,5	GW	1	53,27039	143,26439	2311
19.X	3	1,5	GW	1	53,29275	143,24072	1510
19.X	3	0	GW	1	53,19919	143,26689	221
19.X	5	2,5	GW	1	53,31815	143,21709	715
19.X	5	2,5	GW	1	53,31833	143,2203	927

10.X	15	2	GW	1	52,88301	143,35335	2244
10.X	15	2	GW	1	52,88195	143,35338	2228
10.X	15	0,5	GW	1	52,84807	143,35551	1813
10.X	15	0,5	GW	3	52,8457	143,34835	1298
11.X	1	1	GW	1	53,36777	143,18505	453
11.X	1	6	GW	1	53,40145	143,17352	917
11.X	1	3	GW	2	53,3975	143,19045	1842
11.X	1	0,5	GW	1	53,38311	143,24662	4866
11.X	1	3	GW	2	53,40163	143,19424	2226
11.X	1	7,5	GW	1	53,40756	143,17462	1202
11.X	1	8,5	GW	1	53,40866	143,17288	1131
11.X	1	8	GW	1	53,42324	143,1657	1194
11.X	1	2,5	GW	1	53,44272	143,15513	1218
11.X	3	10	GW	1	53,32505	143,21311	771
11.X	3	10	GW	1	53,3488	143,20371	923
11.X	3	1,7	GW	2	53,3827	143,20393	2008
11.X	3	25	GW	1	53,34164	143,19687	261
11.X	5	5	GW	1	53,23716	143,26189	1593
11.X	5	1,5	GW	1	53,22324	143,31414	4632
11.X	5	1,5	GW	1	53,22416	143,3153	4730
11.X	7	1	GW	1	53,14105	143,31438	3056
11.X	7	2,5	GW	1	53,19754	143,3014	3350
11.X	9	4	GW	1	53,14188	143,27046	284
11.X	13	0	GW	1	52,96352	143,48217	11803
11.X	13	3	GW	1	52,97561	143,33867	2448
11.X	13	1	GW	1	53,00573	143,34535	3330
11.X	15	1,5	GW	1	52,86006	143,33556	685
11.X	15	0,5	GW	1	52,84925	143,35842	2025
11.X	15	1	GW	1	52,86007	143,35313	1852
11.X	15	0,5	GW	1	52,85534	143,36972	2875
11.X	15	2	GW	1	52,87536	143,35141	1989
11.X	15	1	GW	1	52,89159	143,36684	3280
11.X	15	1	GW	1	52,91139	143,33066	1204
12.X	1	1,5	GW	1	53,45147	143,13607	328
12.X	1	3,5	GW	1	53,43671	143,14753	528
12.X	1	4	GW	1	53,43478	143,1532	816
12.X	1	6,5	GW	1	53,42688	143,16284	1143
12.X	1	6,5	GW	1	53,40361	143,17426	1039
12.X	1	3,5	GW	1	53,39824	143,18601	1589
12.X	1	2,5	GW	1	53,38513	143,17444	399
12.X	3	5	GW	1	53,35955	143,19291	575
12.X	3	13	GW	1	53,33763	143,2149	1283
12.X	3	1	GW	1	53,34071	143,29592	6540
12.X	5	1	GW	2	53,31962	143,31691	7224
19.X	1	8,5	GW	1	53,42327	143,15892	765
19.X	5	50	GW	1	53,26142	143,23554	491
19.X	5	1,5	GW	1	53,2306	143,33165	5951
19.X	5	1,5	GW	1	53,19766	143,27005	1133
19.X	5	4	GW	2	53,22332	143,24807	350
19.X	5	1	GW	1	53,18497	143,27312	1014
19.X	7	1,5	GW	2	53,22311	143,24906	441
19.X	7	4,5	GW	1	53,19974	143,2727	1516
19.X	7	14	GW	1	53,18576	143,2671	866
19.X	7	4	GW	1	53,16567	143,28937	1918
19.X	11	1,5	GW	1	53,06554	143,32753	3064
19.X	11	1	GW	3	53,02156	143,31117	1341
19.X	5	50	GW	1	53,26142	143,23554	491
22.X	3	2	GW	2	53,37772	143,18818	849
22.X	3	2	GW	1	53,37786	143,19069	1013
22.X	3	6	GW	1	53,35623	143,19529	622
22.X	3	15	GW	2	53,328	143,20863	580
22.X	3	15	GW	1	53,32787	143,20842	563
22.X	7	7,5	GW	2	53,19461	143,26144	674

19.X	5	4	GW	1	53,3052	143,22072	626
19.X	5	2,5	GW	1	53,31825	143,21869	821
19.X	5	2	GW	1	53,32464	143,21408	682
19.X	5	3,5	GW	1	53,30891	143,22414	941
19.X	5	1,5	GW	1	53,33348	143,24096	2646
19.X	5	3	GW	1	53,31159	143,24834	2576

22.X	7	10	GW	1	53,19115	143,26232	661
22.X	7	10	GW	1	53,19093	143,26332	723
22.X	7	10	GW	1	53,18997	143,26649	911
22.X	7	10	GW	1	53,1887	143,26933	1071
22.X	9	1	GW	1	53,09611	143,29182	989
22.X	13	3	GW	1	52,98032	143,32894	2172
22.10	13	7,5	GW	1	52,96854	143,31239	902

Appendix 9. Results of the onshore gray whale surveys in the Ashtokh-Chayvo section of the Piltun area in July-October, 2004.

1. Date **2.** Observation station number **3.** Reticle reading below the horizon
4. Cetacean Species (GW- gray whale, MW – Minke Whale, HP – Harbor porpoise)
5. Number of animals
6. Latitude north **7.** Longitude east **8.** Distance to shoreline (perpendicular from coast)

1	2	3	4	5	6	7	8
4.VII	21	0,5	GW	1	52,79131	143,32918	105
4.VII	20	0,5	GW	1	52,87485	143,33764	423
4.VII	20	15	GW	1	52,83706	143,33657	168
4.VII	20	5	GW	1	52,84352	143,33998	428
4.VII	20	0,5	GW	1	52,86938	143,36881	2489
5.VII	24	8	GW	1	52,48031	143,31455	1678
5.VII	23	2,5	GW	1	52,52817	143,31517	686
5.VII	21	0,5	GW	1	52,78979	143,34319	1056
5.VII	21	1	GW	1	52,77573	143,35061	1651
5.VII	20	2	GW	1	52,84801	143,35912	1735
5.VII	20	4	GW	1	52,82267	143,34823	881
5.VII	20	1,5	GW	1	52,81367	143,36136	1719
5.VII	20	2,5	GW	2	52,81612	143,34691	761
6.VII	20	3	GW	1	52,84642	143,33332	25
6.VII	20	5	GW	2	52,84122	143,33734	220
6.VII	20	2,5	GW	2	52,84833	143,34001	433
6.VII	20	0,5	GW	1	52,87179	143,34418	827
12.VII	22	1	GW	1	52,68411	143,34287	
12.VII	21	3	GW	2	52,76402	143,32752	178
12.VII	21	2,5	GW	1	52,74316	143,35566	2211
12.VII	21	2,5	GW	1	52,74213	143,35532	2196
12.VII	21	25	GW	2	52,74478	143,32712	282
12.VII	20	1	GW	2	52,85808	143,35809	1695
12.VII	20	1,5	GW	3	52,84682	143,36622	2186
12.VII	20	1,5	GW	1	52,81619	143,36959	2263
13.VII	20	1,5	GW	1	52,85472	143,32527	-526
13.VII	22	30	HP	1	52,64439	143,32235	
13.VII	23	2	GW	1	52,59015	143,33150	1003
13.VII	23	4	GW	2	52,57454	143,33537	1460
13.VII	23	3,5	GW	2	52,55834	143,35062	2688
13.VII	23	4	GW	1	52,56874	143,34277	2030
13.VII	23	5	GW	1	52,56540	143,33942	1847
13.VII	24	2,5	GW	4	52,51425	143,30772	378
13.VII	24	2	GW	3	52,51794	143,31330	654
13.VII	24	1,5	GW	1	52,52252	143,32186	1105
14.VII	24	5	UD	1	52,49498	143,31807	1543
14.VII	20	2	GW	1	52,84979	143,34845	1007
14.VII	20	2,5	GW	1	52,84691	143,34761	936
14.VII	20	2	GW	1	52,84807	143,35387	1363
14.VII	20	1,5	GW	1	52,83975	143,37348	2639
24.VII	20	1,5	GW	3	52,85412	143,35692	1617
24.VII	20	5	GW	1	52,84404	143,33427	48
24.VII	20	2,5	GW	3	52,81552	143,34444	592
24.VII	22	18	HP	3	52,65042	143,32386	
24.VII	24	12	HP	7	52,49025	143,30204	603
24.VII	24	9,5	HP	4	52,47824	143,31063	1471
24.VII	24	2,5	GW	1	52,45571	143,32606	3054
24.VII	24	6,5	HP	2	52,47040	143,31229	1777
24.VII	24	8	HP	3	52,47075	143,30683	1407
15.VIII	20	1,5	GW	1	52,84407	143,37178	2566
15.VIII	20	1	GW	1	52,81696	143,37881	2907

1	2	3	4	5	6	7	8
24.VII	24	10	HP	4	52,46947	143,29449	625
26.VII	20	10	GW	2	52,82951	143,34311	570
26.VII	21	1,5	GW	2	52,77218	143,33827	846
26.VII	21	3	GW	1	52,73697	143,34769	1718
31.VII	22	25	GW	2	52,64837	143,32354	
31.VII	21	30	MW	1	52,74765	143,32684	244
31.VII	20	4	GW	2	52,84610	143,33540	133
31.VII	20	2,5	GW	1	52,84857	143,35039	1151
1.VIII	20	1	GW	2	52,86352	143,32424	531
1.VIII	20	0,5	GW	1	52,87370	143,35083	1303
1.VIII	20	5	GW	2	52,84147	143,34615	833
1.VIII	20	?	GW	2			
2.VIII	22	20	HP	2	52,64839	143,32517	466
2.VIII	21	1	GW	1	52,78014	143,32378	183
2.VIII	21	1,5	GW	2	52,77374	143,32522	42
2.VIII	21	1,5	GW	1	52,77374	143,32522	42
2.VIII	20	4,5	GW	1	52,84488	143,33705	238
2.VIII	20	2,5	GW	1	52,84481	143,35762	1619
2.VIII	20	2,5	GW	1	52,84431	143,35829	1661
3.VIII	20	4	GW	2	52,84072	143,35200	1222
3.VIII	20	2	MW	2	52,82932	143,36905	2311
3.VIII	20	3,5	GW	3	52,83526	143,35819	1610
3.VIII	21	2	GW	2	52,76955	143,32224	-214
6.VIII	22	1	GW	1	52,68600	143,33284	800
6.VIII	22	1	GW	2	52,68641	143,32940	566
6.VIII	21	5	GW	1	52,74871	143,34288	1315
6.VIII	21	2	GW	1	52,72571	143,33936	1234
6.VIII	20	2	GW	2	52,85413	143,33603	214
6.VIII	20	3,5	GW	2	52,84706	143,34009	452
6.VIII	20	7	GW	1	52,83862	143,34477	726
6.VIII	20	5	GW	2	52,84096	143,34711	895
6.VIII	20	7,5	GW	1	52,83787	143,34479	724
6.VIII	20	7,5	GW	4	52,83695	143,34583	789
6.VIII	20	7,5	GW	2	52,83719	143,34559	774
6.VIII	20	5,5	GW	1	52,83842	143,34883	998
6.VIII	20	4	GW	2	52,83572	143,35574	1449
6.VIII	20	2	GW	2	52,83301	143,36955	2363
7.VIII	20	1,5	GW	1	52,85435	143,35630	1577
7.VIII	20	3	GW	1	52,83801	143,35993	1741
7.VIII	20	5	GW	2	52,82381	143,34503	672
7.VIII	20	7	GW	2	52,82662	143,34383	605
7.VIII	20	6,5	GW	1	52,82789	143,34681	811
7.VIII	20	4	GW	1	52,81970	143,33334	-133
7.VIII	22	3	GW	1	52,66086	143,34531	1763
13.VIII	21	1,5	GW	1	52,76379	143,35793	2224
13.VIII	21	1,5	GW	1	52,76342	143,35842	2259
15.VIII	20	1,5	GW	2	52,85801	143,33051	137
15.VIII	20	1,5	GW	2	52,84818	143,36757	2303
15.VIII	20	1,5	GW	1	52,84954	143,36572	2186
28.VIII	20	1	GW	1	52,85826	143,36453	2148
28.VIII	20	2	GW	1	52,85037	143,35440	1429

15.VIII	21	1,5	GW	1	52,77346	143,32991	275
15.VIII	22	15	HP	1	52,64672	143,32822	679
15.VIII	22	7,5	HP	2	52,64740	143,33636	1225
16.VIII	20	1,5	GW	3	52,85616	143,35048	1194
16.VIII	20	1	GW	1	52,85094	143,37655	2920
16.VIII	21	1	GW	1	52,78011	143,32572	52
16.VIII	21	3,5	HP	3	52,75875	143,33986	1043
16.VIII	21	4	HP	3	52,73277	143,33018	569
16.VIII	21	5	HP	2	52,73468	143,32773	391
16.VIII	24	2,5	HP	3	52,51213	143,31583	966
16.VIII	24	6	HP	4	52,49252	143,31547	1433
17.VIII	20	1,5	GW	2	52,85799	143,33852	400
17.VIII	20	2,5	GW	2	52,85054	143,34313	674
17.VIII	20	2	GW	3	52,85278	143,34681	931
17.VIII	20	1	GW	1	52,86310	143,34749	1027
17.VIII	20	2,5	GW	1	52,84873	143,34993	1122
17.VIII	20	1	GW	3	52,81338	143,37471	2614
17.VIII	20	1,5	GW	2	52,80781	143,33022	-400
17.VIII	21	10	HP	2	52,75315	143,32618	162
17.VIII	21	13	HP	3	52,75055	143,32967	415
17.VIII	21	23	HP	3	52,74854	143,32730	269
17.VIII	23	5	HP	2	52,53930	143,31238	359
17.VIII	23	6	HP	3	52,54178	143,31357	407
18.VIII	24	5	HP	3	52,49946	143,31051	932
18.VIII	24	8	MW	1	52,47075	143,30683	1407
18.VIII	22	10	HP	4	52,65167	143,32959	747
19.VIII	23	10	HP	1	52,56713	143,32113	596
22.VIII	21	1,5	GW	2	52,76866	143,34936	1615
22.VIII	21	5	HP	1	52,75654	143,33455	701
22.VIII	21	10	HP	3	52,74008	143,32704	309
22.VIII	21	7,5	HP	2	52,73852	143,32907	456
22.VIII	20	1,5	GW	2	52,85796	143,32979	186
22.VIII	20	0,5	GW	3	52,87429	143,34608	987
22.VIII	20	1	GW	1	52,85857	143,36379	2100
22.VIII	20	1	GW	1	52,85794	143,36526	2195
22.VIII	20	1	GW	1	52,85727	143,36669	2288
22.VIII	20	3	GW	2	52,83242	143,36128	1805
22.VIII	20	1,5	GW	1	52,82822	143,37538	2731
22.VIII	20	1,5	GW	1	52,82736	143,37508	2707
22.VIII	20	1	GW	1	52,80874	143,36711	2081
22.VIII	20	1,5	GW	1	52,81311	143,36024	1641
22.VIII	20	4	GW	2	52,81969	143,33487	-31
27.VIII	24	15	HP	2	52,48108	143,30441	989
27.VIII	24	8	HP	2	52,47822	143,31396	1692
27.VIII	23	1,5	MW	1	52,57471	143,37071	3832
27.VIII	23	20	HP	1	52,55989	143,32004	614
27.VIII	23	18	HP	2	52,56077	143,32087	658
27.VIII	21	1	GW	3	52,77991	143,32958	209
27.VIII	21	2,5	GW	1	52,76568	143,33259	508
27.VIII	20	1	GW	1	52,81213	143,37296	2490
27.VIII	20	1,5	GW	2	52,80769	143,33532	-59
28.VIII	20	1	GW	1	52,86055	143,35840	1747
7.IX	22	4,5	HP	2	52,66249	143,32411	326
10.IX	21	0,5	GW	1	52,78391	143,36429	2514
10.IX	20	1,5	GW	3	52,80771	143,33604	10
10.IX	20	1,5	GW	1	52,81136	143,35605	1351
10.IX	20	3,5	GW	1	52,82502	143,35468	1325
11.IX	20	2	GW	1	52,83486	143,36940	2361
11.IX	20	1	GW	1	52,81133	143,37174	2404
11.IX	20	1	GW	2	52,80515	143,35808	1457
11.IX	20	1	GW	1	52,80491	143,35727	1402
11.IX	20	1	GW	1	52,80309	143,34974	887

28.VIII	20	5	GW	1	52,83276	143,35281	1238
28.VIII	20	1,5	GW	1	52,84987	143,36524	2155
28.VIII	20	1	GW	1	52,85351	143,37320	2707
29.VIII	21	1	GW	3	52,77889	143,33813	790
29.VIII	21	1	GW	1	52,77417	143,35471	1937
29.VIII	20	2,5	GW	1	52,81599	143,34643	727
29.VIII	20	2	GW	1	52,81324	143,34772	801
29.VIII	20	2	GW	1	52,81230	143,34306	483
29.VIII	20	1,5	GW	1	52,80836	143,34397	526
30.VIII	20	3	MW	2	52,84902	143,33798	320
30.VIII	20	3	GW	1	52,84902	143,33798	320
30.VIII	20	2,5	GW	2	52,85054	143,34313	674
30.VIII	20	3,5	HP	2	52,83913	143,35619	1495
30.VIII	20	1,5	GW	1	52,83215	143,37609	2797
30.VIII	20	1	GW	1	52,80168	143,33374	-194
30.VIII	21	0,5	GW	2	52,79095	143,33433	453
30.VIII	21	2,5	GW	1	52,75570	143,35245	1911
30.VIII	21	13	HP	2	52,74607	143,33242	629
30.VIII	21	5	UBW	2	52,74263	143,34215	1307
30.VIII	22	1,5	GW	2	52,61737	143,34494	1949
30.VIII	24	7,5	HP	2	52,49129	143,31088	1161
30.VIII	24	13	HP	3	52,48665	143,30505	893
5.IX	20	2,5	GW	1	52,85086	143,34107	537
5.IX	20	1	GW	1	52,86336	143,34573	911
5.IX	20	1	GW	1	52,86324	143,34661	969
5.IX	20	2	GW	2	52,84720	143,36039	1816
5.IX	20	5	GW	1	52,83658	143,35178	1187
5.IX	20	5,5	GW	2	52,83597	143,35071	1112
5.IX	20	1	GW	2	52,80839	143,36640	2032
5.IX	20	4	GW	1	52,81974	143,33639	72
5.IX	22	7,5	HP	1	52,65725	143,32184	198
5.IX	22	6,5	HP	4	52,65854	143,32264	246
6.IX	24	25	HP	2	52,48028	143,29868	632
6.IX	24	30	HP	3	52,48101	143,29747	533
6.IX	22	10	HP	1	52,64230	143,33088	880
6.IX	22	15	HP	1	52,64253	143,32602	551
6.IX	20	1,5	GW	1	52,85705	143,34636	922
6.IX	20	1,5	GW	1	52,85729	143,34496	829
6.IX	20	4	GW	1	52,82411	143,35070	1054
6.IX	20	9	GW	3	52,82824	143,34273	539
6.IX	20	4	GW	1	52,83228	143,35622	1464
6.IX	20	7,5	GW	1	52,82716	143,34364	595
6.IX	20	5	GW	2	52,82300	143,34283	520
6.IX	20	2,5	GW	2	52,81451	143,33293	186
7.IX	20	2,5	GW	2	52,84686	143,35425	1402
7.IX	20	1	GW	1	52,84865	143,37900	3073
7.IX	20	1	GW	1	52,84424	143,38253	3288
7.IX	20	1,5	GW	2	52,83741	143,37543	2779
7.IX	20	1,5	GW	1	52,83567	143,37585	2799
7.IX	20	1	GW	1	52,83741	143,38552	3456
7.IX	20	1	GW	1	52,83578	143,38584	3469
7.IX	22	5	HP	3	52,66133	143,32323	272
14.IX	21	0,5	GW	1	52,78391	143,36429	2514
14.IX	21	0,5	GW	1	52,71277	143,37209	3522
14.IX	23	3,5	GW	2	52,54921	143,34778	2613
15.IX	22	32	HP	5	52,64586	143,32308	337
15.IX	20	4,5	GW	1	52,82171	143,34196	456
15.IX	20	3,5	GW	2	52,82590	143,35554	1387
15.IX	20	4	GW	1	52,82888	143,35521	1380
15.IX	20	2,5	GW	2	52,83043	143,36458	2016
15.IX	20	3,5	GW	1	52,83959	143,35581	1472
15.IX	20	4	GW	1	52,84509	143,34281	626

11.IX	20	3,5	GW	1	52,81891	143,34114	387
11.IX	21	59	GW	1	52,74748	143,32460	95
11.IX	21	2	GW	1	52,76290	143,34986	1687
11.IX	21	1,5	GW	1	52,76556	143,35531	2036
11.IX	21	2	GW	1	52,76232	143,35079	1754
11.IX	21	2	GW	1	52,76318	143,34938	1654
11.IX	21	2	GW	1	52,76290	143,34986	1687
11.IX	21	3	GW	3	52,75889	143,34402	1322
11.IX	21	1,5	GW	1	52,76522	143,35586	2075
12.IX	23	8	HP	1	52,56564	143,32851	1110
13.IX	22	2	GW	2	52,66649	143,35094	2115
13.IX	22	1,5	GW	2	52,67496	143,34610	1748
13.IX	22	1,5	GW	1	52,67496	143,34610	1748
13.IX	22	1,5	GW	1	52,67658	143,34102	1398
13.IX	21	1,5	GW	1	52,72638	143,35339	2173
13.IX	21	1	GW	1	52,72937	143,37085	3326
13.IX	21	0,5	GW	1	52,78856	143,34934	1478
13.IX	21	0,5	GW	1	52,78909	143,34690	1311
13.IX	21	0,5	GW	1	52,78957	143,34443	1141
13.IX	21	0,5	GW	1	52,78999	143,34194	971
13.IX	20	3,5	GW	2	52,81832	143,33450	62
13.IX	20	3	GW	1	52,81746	143,34282	493
13.IX	20	5	GW	1	52,82440	143,34630	760
13.IX	20	3,5	GW	1	52,82590	143,35554	1387
13.IX	20	3,5	GW	2	52,83221	143,35848	1615
13.IX	20	3	GW	1	52,83213	143,36127	1802
13.IX	20	3	GW	1	52,83299	143,36130	1808
13.IX	20	2,5	GW	1	52,83524	143,36460	2041
13.IX	20	3	GW	1	52,83664	143,36057	1777
13.IX	20	3	GW	1	52,83664	143,36057	1777
14.IX	20	1	GW	1	52,86336	143,34573	911
14.IX	20	1	GW	1	52,86336	143,34573	911
14.IX	20	1	GW	1	52,86104	143,35678	1641
14.IX	20	1	GW	2	52,86406	143,33771	375
14.IX	20	1	GW	1	52,86402	143,33861	435
14.IX	20	3,5	GW	2	52,84233	143,35278	1282
14.IX	20	2,5	GW	1	52,84505	143,35727	1596
14.IX	20	2	GW	1	52,84426	143,36411	2052
14.IX	20	2	GW	1	52,84488	143,36343	2009
14.IX	20	2	GW	2	52,84548	143,36272	1965
14.IX	20	0,5	GW	3	52,79494	143,36407	1810
14.IX	20	1,5	GW	2	52,80773	143,33677	39
14.IX	21	0,5	GW	2	52,78979	143,34319	1056
14.IX	21	0,5	GW	1	52,78476	143,36211	2362
30.IX	22	1	GW	1	52,68357	143,34503	1634
30.IX	20	2	GW	1	52,81718	143,35805	1513
30.IX	20	2	GW	1	52,81769	143,35894	1576
30.IX	20	3,5	GW	1	52,82229	143,35092	1060
30.IX	20	1	GW	1	52,81172	143,37236	2448
30.IX	20	1,5	GW	2	52,83741	143,37543	2779
30.IX	20	1,5	GW	1	52,83391	143,37607	2805
30.IX	20	1,5	GW	1	52,83303	143,37610	2803
30.IX	20	1,5	GW	1	52,83827	143,37515	2764
30.IX	20	1,5	GW	1	52,83913	143,37481	2746
30.IX	20	2	GW	1	52,84298	143,36535	2129
30.IX	20	1,5	GW	1	52,84853	143,36712	2275
30.IX	20	1,5	GW	1	52,84206	143,37325	2655
30.IX	20	3	GW	1	52,84780	143,34519	799
30.IX	20	1	GW	1	52,86296	143,34836	1085
1.X	20	0,5	GW	1	52,86742	143,37394	2824
1.X	20	0,5	GW	1	52,87416	143,34728	1067
1.X	20	0,5	GW	1	52,86863	143,37089	2626

16.IX	20	1,5	GW	1	52,85740	143,34425	783
16.IX	20	2,5	GW	1	52,83619	143,36436	2030
16.IX	20	3	GW	1	52,82387	143,35677	1460
16.IX	20	1	GW	2	52,86387	143,32780	-291
16.IX	22	9	HP	4	52,63689	143,32012	181
16.IX	24	32	HP	1	52,48105	143,29713	510
22.IX	22	30	HP	2	52,64462	143,32262	312
22.IX	22	13	HP	2	52,65287	143,32328	316
22.IX	21	3,5	MW	1	52,74118	143,34780	1696
22.IX	21	2,5	GW	1	52,75919	143,34866	1632
22.IX	21	2,5	GW	1	52,76297	143,34190	1152
22.IX	20	2	GW	1	52,81297	143,34658	723
22.IX	20	2,5	GW	1	52,82550	143,36228	1838
22.IX	20	2,5	GW	1	52,82854	143,36398	1967
22.IX	20	3,5	GW	2	52,83650	143,35776	1588
22.IX	20	2,5	GW	1	52,83959	143,36277	1939
22.IX	20	2,5	GW	1	52,83989	143,36257	1927
22.IX	20	2,5	GW	1	52,84219	143,36069	1812
23.IX	24	13	HP	3	52,47726	143,30527	1142
23.IX	24	15	HP	3	52,47939	143,30391	999
23.IX	23	7,5	HP	2	52,54598	143,32142	882
23.IX	23	7,5	HP	1	52,55263	143,33151	1476
23.IX	21	1	GW	1	52,75708	143,37582	3472
23.IX	21	0,5	GW	1	52,78883	143,34812	1395
23.IX	20	2,5	GW	1	52,82669	143,36307	1897
23.IX	20	2,5	GW	1	52,82609	143,36269	1868
23.IX	20	1,5	GW	1	52,85285	143,35989	1810
23.IX	20	0,5	GW	2	52,87402	143,34847	1146
24.IX	20	2	GW	1	52,81769	143,35894	1576
24.IX	20	1,5	GW	1	52,83827	143,37515	2764
26.IX	20	2	GW	1	52,85236	143,34851	1044
26.IX	20	1,5	GW	1	52,83259	143,37610	2800
26.IX	20	2,5	GW	2	52,82089	143,35748	1493
26.IX	20	1,5	GW	1	52,81367	143,36136	1719
29.IX	20	0,5	GW	1	52,87451	143,34368	827
29.IX	20	0,5	GW	1	52,87441	143,34488	907
29.IX	20	2,5	GW	1	52,83460	143,36472	2046
29.IX	21	2,5	GW	1	52,74213	143,35532	2196
29.IX	23	23	HP	3	52,56025	143,31878	524
30.IX	23	0,5	GW	1	52,49713	143,33620	2490
30.IX	23	0,5	GW	1	52,49741	143,33795	2604
30.IX	23	1,5	GW	1	52,53259	143,36134	3733
30.IX	23	2,5	GW	1	52,54236	143,35281	3037
30.IX	22	1	GW	1	52,66563	143,37707	3881
5.X	21	1	GW	1	52,72788	143,36930	3232
5.X	21	0,5	GW	1	52,71437	143,37494	3703
5.X	21	1	GW	1	52,72644	143,36762	3129
5.X	21	1	GW	2	52,71812	143,35277	2187
5.X	22	0,5	GW	1	52,69496	143,35496	2248
5.X	22	0,5	GW	2	52,69415	143,35773	2439
5.X	22	0,5	GW	1	52,69236	143,36313	2812
5.X	22	0,5	GW	2	52,69283	143,36180	2720
5.X	22	0,5	GW	1	52,69138	143,36574	2993
5.X	22	18	HP	1	52,64229	143,32382	404
5.X	22	0,5	GW	1	52,59344	143,33085	1115
5.X	23	2,5	GW	1	52,57649	143,35006	2422
5.X	23	3,5	GW	1	52,55081	143,34873	2656
5.X	24	0,5	GW	1	52,54883	143,32271	502
5.X	24	0,5	GW	1	52,54847	143,32462	638
5.X	24	0,5	GW	1	52,54768	143,32842	908
6.X	24	3	GW	2	52,50204	143,32750	1989
6.X	24	2	GW	1	52,51130	143,33133	2010

1.X	20	1	GW	2	52,83415	143,38602	3474
1.X	20	1	GW	1	52,83143	143,38600	3459
1.X	20	2,5	GW	1	52,82730	143,36341	1922
1.X	20	2,5	GW	1	52,82700	143,36324	1910
1.X	20	2	GW	1	52,82402	143,36633	2103
1.X	20	3,5	GW	1	52,83475	143,35831	1616
1.X	20	0,5	GW	1	52,80087	143,37933	2863
1.X	20	1,5	GW	1	52,80974	143,35088	996
1.X	20	1,5	GW	1	52,80883	143,34678	716
1.X	20	0,5	GW	2	52,79240	143,35271	1035
1.X	20	1,5	GW	1	52,81748	143,36739	2142
1.X	20	0,5	GW	1	52,79702	143,37048	2250
1.X	20	2	GW	1	52,81187	143,33945	239
1.X	21	0,5	GW	1	52,79095	143,33433	453
1.X	21	0,5	GW	1	52,78934	143,34567	1226
1.X	21	0,5	GW	1	52,78909	143,34690	1311
1.X	21	1,5	GW	1	52,76487	143,35639	2113
1.X	21	3,5	GW	1	52,74066	143,34747	1678
1.X	21	0,5	GW	1	52,71549	143,37677	3818
1.X	22	0,5	GW	1	52,69457	143,35635	2344
1.X	22	0,5	GW	1	52,69457	143,35635	2344
1.X	23	1	GW	1	52,51078	143,32760	1740
1.X	24	1	GW	1	52,51625	143,35876	3697
1.X	24	1	GW	1	52,51697	143,35777	3613
5.X	20	1	GW	1	52,86055	143,35840	1747
5.X	20	1	KW	1	52,86002	143,35998	1851
5.X	20	0,5	GW	1	52,86901	143,36986	2558
5.X	20	1	GW	1	52,85794	143,36526	2195
5.X	20	1,5	KW	1	52,85019	143,36474	2123
5.X	20	2	GW	1	52,83779	143,36861	2322
5.X	20	2,5	GW	1	52,84643	143,35504	1454
5.X	20	2,5	GW	1	52,82823	143,36385	1957
5.X	20	2	GW	1	52,82787	143,36855	2270
5.X	20	0,5	GW	3	52,79593	143,36732	2033
5.X	21	0,5	GW	1	52,76920	143,38719	4154
5.X	21	1	GW	1	52,75426	143,37714	3580
7.X	22	0,5	GW	1	52,69673	143,34784	1759
7.X	22	0,5	GW	1	52,69496	143,35496	2248
7.X	22	0,5	GW	1	52,59311	143,32626	807
7.X	23	4	GW	1	52,55145	143,34541	2425
7.X	23	0,5	GW	1	52,49556	143,32197	1553
7.X	23	0,5	GW	1	52,49713	143,33620	2490
7.X	23	0,5	GW	1	52,49687	143,33444	2375
7.X	24	2,5	GW	1	52,51341	143,31140	642
7.X	24	2,5	GW	2	52,50530	143,33062	2113
7.X	24	2,5	GW	1	52,50616	143,32924	2001
7.X	24	2,5	GW	2	52,50161	143,33558	2534
7.X	24	0,5	GW	2	52,51920	143,38680	5474
8.X	24	1	GW	1	52,43588	143,33739	4298
8.X	24	4	GW	1	52,46526	143,32131	2501
8.X	24	4	MW	1	52,47624	143,33038	2825
8.X	24	1,5	GW	2	52,51336	143,34278	2714
8.X	24	0,5	GW	1	52,54069	143,35176	2623
8.X	23	1	GW	1	52,51162	143,33300	2093
8.X	23	1	GW	1	52,51239	143,33698	2350
8.X	23	1	GW	1	52,51298	143,33960	2519
8.X	23	1	GW	1	52,51162	143,33300	2093
8.X	23	3	GW	1	52,56886	143,35127	2599
8.X	22	0,5	GW	1	52,59411	143,33690	1520
8.X	21	0,5	GW	1	52,75610	143,39563	4810
8.X	21	0,5	GW	1	52,75146	143,39688	4926
8.X	20	1,5	GW	2	52,81425	143,36246	1795

6.X	23	1	GW	2	52,51268	143,33829	2435
6.X	23	1,5	GW	2	52,52138	143,33668	2217
6.X	23	1	GW	2	52,57020	143,38797	5048
6.X	23	1,5	GW	1	52,56675	143,37504	4223
6.X	22	14	HP	1	52,64421	143,32864	720
6.X	22	1	GW	1	52,64163	143,38461	4507
6.X	22	1,5	GW	1	52,64307	143,37265	3693
6.X	22	1	GW	1	52,67423	143,36684	3150
6.X	22	1,5	GW	1	52,67435	143,34773	1861
6.X	22	0,5	GW	1	52,69496	143,35496	2248
6.X	22	0,5	GW	2	52,69087	143,36703	3082
6.X	21	0,5	GW	1	52,70734	143,35943	2708
6.X	21	0,5	GW	1	52,70625	143,35599	2484
6.X	21	1	GW	1	52,72167	143,36047	2681
6.X	21	0,5	GW	1	52,71277	143,37209	3522
6.X	21	1,5	GW	1	52,76227	143,35983	2362
6.X	20	1	GW	1	52,80908	143,36780	2129
6.X	20	1	GW	2	52,86127	143,35597	1588
6.X	20	1,5	GW	1	52,85616	143,35048	1194
6.X	20	1	GW	1	52,86149	143,35515	1534
6.X	20	1	GW	1	52,86191	143,35348	1424
7.X	20	1	GW	1	52,86191	143,35348	1424
7.X	20	1	GW	2	52,86055	143,35840	1747
7.X	20	1	GW	1	52,86080	143,35759	1695
7.X	20	1,5	GW	1	52,85581	143,35181	1282
7.X	20	0,5	GW	1	52,79281	143,35504	1193
7.X	20	0,5	GW	1	52,79327	143,35734	1350
7.X	20	0,5	GW	1	52,79628	143,36839	2106
7.X	20	0,5	GW	1	52,79593	143,36732	2033
7.X	20	0,5	GW	1	52,79158	143,34680	634
7.X	21	1,5	GW	1	52,75463	143,36607	2833
7.X	21	2,5	GW	1	52,74942	143,35578	2177
7.X	21	1	GW	1	52,75080	143,37818	3673
7.X	21	1	GW	1	52,73687	143,37629	3640
7.X	21	0,5	GW	1	52,71606	143,37765	3874
7.X	21	1	GW	1	52,72461	143,36520	2978
9.X	20	1	KW	4	52,81338	143,37471	2614
9.X	21	0,5	GW	2	52,78256	143,36746	2737
9.X	21	1	GW	2	52,77001	143,36284	2512
9.X	22	0,5	GW	1	52,69673	143,34784	1759
9.X	22	0,5	GW	2	52,69703	143,34638	1660
9.X	22	0,5	GW	1	52,59454	143,33989	1720
9.X	23	2	GW	2	52,55839	143,36713	3797
9.X	23	2,5	GW	2	52,55942	143,36017	3316
9.X	23	1	GW	1	52,50996	143,31935	1196
9.X	23	0,5	GW	2	52,49528	143,31656	1193
9.X	24	1,5	GW	1	52,50856	143,34947	3276
9.X	24	1,5	GW	1	52,50662	143,35168	3471
9.X	24	2	GW	1	52,51769	143,31434	729
9.X	24	1	GW	2	52,52364	143,34671	2717
11.X	20	2	GW	1	52,85278	143,34681	931
11.X	20	1,5	GW	1	52,85202	143,36159	1920
11.X	20	1,5	GW	1	52,85202	143,36159	1920
11.X	20	2	GW	1	52,84774	143,35955	1763
11.X	20	1,5	GW	1	52,84368	143,37210	2586
11.X	20	1,5	GW	1	52,84040	143,37422	2712
11.X	22	1,5	GW	1	52,66364	143,36495	3074
11.X	23	3,5	GW	1	52,56504	143,34901	2496
11.X	23	2,5	GW	1	52,53421	143,34066	2323
11.X	23	2,5	GW	2	52,53359	143,33926	2237
11.X	23	4,5	GW	2	52,54488	143,33609	1881
11.X	23	1,5	GW	1	52,52013	143,33130	1871

8.X	20	0,5	GW	1	52,86824	143,37192	2693
8.X	20	1,5	GW	1	52,85458	143,35568	1536
8.X	20	1	GW	1	52,85947	143,36153	1952
9.X	20	0,5	GW	1	52,87290	143,35550	1613
9.X	20	1	GW	1	52,85826	143,36453	2148
9.X	20	0,5	GW	1	52,86824	143,37192	2693
9.X	20	9	KW	5	52,83318	143,34573	764
9.X	20	1	GW	1	52,81380	143,37527	2653

11.X	23	0,5	GW	2	52,49518	143,30932	709
11.X	23	0,5	GW	1	52,49521	143,30751	587
11.X	24	1	GW	2	52,53080	143,32840	1329
11.X	24	1,5	GW	1	52,52217	143,32302	1190
11.X	24	1	GW	1	52,52856	143,33526	1838
11.X	24	7	GW	3	52,47585	143,31564	1862
11.X	24	4	GW	1	52,46036	143,31198	2008