Northeast Fisheries Science Center Reference Document 06-24

Analysis of Virginia Fisheries Effort as a Component in the Development of a Fisheries Sampling Plan to Investigate the Causes of Sea Turtle Strandings

by

Christopher D. Orphanides and Kathryn D. Bisack

November 2006

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Analysis of Virginia Fisheries Effort as a Component in the Development of a Fisheries Sampling Plan to Investigate the Causes of Sea Turtle Strandings

by

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Acronyms

CFDBS	=	Commercial Fisheries Database System
CV	=	coefficient of variation
NMFS	=	National Marine Fisheries Service
NOAA	=	National Oceanic and Atmospheric Administration
STSSN	=	Sea Turtle Stranding and Salvage Network
VMRC	=	Virginia Marine Resources Commission
VTR	=	vessel trip report

Abstract

Commercial fisheries interact with sea turtles in Virginia state waters and adjacent federal ocean waters. We analyzed fishing effort data and sea turtle strandings in Virginia obtained during May through July 2001-2003 to develop an observer sampling scheme for Virginia commercial fisheries. Commercial landings and fishing trips were summarized by gear type, area, year, and week. Sea turtle strandings were summarized by area, year, week, and species. Spatial and temporal patterns in fishing effort were then compared to sea turtle strandings. Gillnet fishing activity peaked most consistently with the timing of sea turtle strandings. However, data limitations precluded the determination of any significant relationships between fishing activity and turtle strandings.

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INTRODUCTION

Annual reported sea turtle strandings in Virginia peaked at 506 animals in 2003 (Swingle et al. 2004), with May and June having the highest number of strandings in all years (NMFS 2002). In 2002, NMFS enacted measures aimed at reducing sea turtle mortality in Virginia pound net gear (NMFS 2002).

This report analyzes commercial effort during May-July in 2001, 2002, and 2003 in other Virginia fisheries, as a step towards allocating fishery observer coverage as part of a long-term bycatch monitoring plan. Such a plan typically comprises several stages as enumerated in the NMFS National Approach to Standardized Bycatch Monitoring Programs (NOAA, 2004). Before observer coverage begins, anecdotal or other evidence (such as strandings) often indicate that bycatches are occurring. Using this anecdotal information, a baseline observer program is then established to assess whether a systematic program is needed to estimate bycatch. At the conclusion of the baseline stage, sufficient data are generally available to determine if there is indeed a bycatch problem. If so, the sampling program then moves to a pilot stage to obtain refined bycatch estimates, and estimates of the bycatch variance. During the pilot stage, the fishery is commonly sampled proportional to effort. After several years of sampling, the sampling program typically advances to an optimal sampling design, which requires an assessment of how many sampling trips are needed to determine the total bycatch with an acceptable coefficient of variation (CV). A more developed observer program may be implemented which allows alternative stratification designs to be deployed in an optimal approach[1]. If regulations are developed and enacted to reduce bycatches, sampling intensity may need to increase to attain acceptable CVs if observed bycatches decrease as a consequence of the management regimen, because the associated variances of the bycatch rates usually increase when this occurs. By following these steps, bycatches can be systematically assessed, then monitored in the future.

The present study is at the baseline observer program stage. The Sea Turtle Stranding and Salvage Network (STSSN) has documented sea turtles strandings on Virginia beaches for 25 years, particularly during spring when sea turtles migrate into the Chesapeake Bay. In 2001 stranding levels jumped following increased strandings in the previous five years. Also, in spring 2001 a NMFS observer found three loggerhead turtles entwined in the large mesh of two pound net leaders. Sea turtle interactions in the region have been documented in the sea scallop dredge (Murray 2005), bottom otter trawl (Murray 2006), and gillnet fisheries (NMFS unpublished data). It is hypothesized that some strandings may have been caused by interactions with these and other fisheries; however, further observation is necessary to confirm or deny the link between fishery interactions and strandings.

The objectives of this study were to (a) document commercial fishing effort for fisheries that may interact with sea turtles in the Virginia state waters and adjacent federal ocean waters, and (b) use this information to begin to develop an observer sampling plan for these fisheries. The study examined sea turtle strandings data obtained during May through July in 2001-2003. Fishing effort and sea turtle strandings data were examined by region and gear type.

[1] Examples of alternative designs are observing all components of the fishery every few years and not at all in between, or observing only some components of the fishery every year with the goal that all components of the fishery are observed every few years.

METHODS

Development of a Suggested Sampling Plan to Allocate Observer Coverage

The coastal Virginia bycatch monitoring program is in the early stages of development. As a first step in developing a suggested sampling plan, we examined the deployment of commercial fishing effort that occurred at the approximate time and areas coincident with turtle strandings. After accounting for logistic constraints, this information was then used to allocate observer coverage proportional to fishing effort.

Times of the year and fishing areas adjacent to shores having high levels of strandings were recommended as priorities for observer coverage. To detect fine scale patterns of sea turtle strandings and commercial fishing activity, our temporal stratification was weekly. Concentrating on areas with high levels of turtle strandings, we restricted our spatial strata to the southern portion of the Chesapeake Bay and to federal waters (i.e., Statistical Areas 625 and 631, Figure 1) adjacent to Virginia.

We next decided which fishing gears should be suggested for observer coverage. Fishing gear with documented or suspected sea turtle interactions in Virginia waters (state and federal) include gillnet, haul seine, scallop trawl, bottom fish trawls, purse seine, pound net, pot gear, and handline.[2] Pound net and pot gear were excluded from analysis here because separate alternative platform sampling programs have been enacted for fisheries using these gears.[3]

Data Sources and Analysis

Data from four sources were used in our analyses:

- Virginia Marine Resources Commission (VMRC)
- National Marine Fisheries Service (NMFS) Vessel Trip Report (VTR)
- Commercial Fisheries Database System (CFDBS)
- Virginia sea turtle strandings data.

VMRC, VTR, and CFDBS report commercial fishery landings by fish species by trip. VMRC records provide data on the catch landed in state waters, while the VTR and CFDBS records provide catch data from both state and federal waters. Most, but not all, of Virginia area fisheries data are represented in the state VMRC and federal VTR data. CFDBS data were used to assess purse seine effort, because this fishery is not included in either the VMRC or VTR data bases. The purse seine was the only fishery for which the CFDBS data were used.

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[2] Although this sampling plan does not include gillnet and scallop dredge fisheries in Areas 626 and 632, other NMFS programs (not described in this paper) have allocated observer coverage to this portion of the fishery.

[3] The pound net alternative platform sampling program requires an experienced observer to operate a vessel independent of the fishing vessel to check for turtles caught in the pound leader. The second platform provides observer safety and improved observation abilities. In the case of pot gear, it is possible that if an interaction has occurred, the turtle will unlikely be seen when the pot is hauled out of the water. Estimating bycatch in this fishery may be best achieved through an alternative platform approach using sonar and a diver to check for bycatch before the pot is pulled from the water.

Sea turtle strandings data provided information on the turtle species, location of each reported stranding, the date of the stranding, and the condition of the turtle.[4]

To investigate the relationship between sea turtle strandings and fishing effort, the VMRC, VTR, and strandings data were stratified spatially and temporally by the same strata. The temporal stratification comprised one week periods from April 29 to July 30. The spatial stratification used four regions within Chesapeake Bay and six regions outside of the Bay. Fishing locations were identified using latitude and longitude bearings recorded on the VTRs and the Virginia state-defined regions provided in the VMRC records. The four quadrants inside the bay were created by combining a number of the smaller Virginia state-defined regions and include the northeast (NE), northwest (NW), southeast (SE), and southwest (SW) (Figure 1). Quadrants outside the bay encompassed both state and federal waters. Waters outside of the bay and within 3 miles of shore were defined as state waters, and fishing effort in these waters was recorded in both the VMRC and VTR records. We separated state waters at 37 north latitude: north Atlantic (NA) and south Atlantic (SA). Fishing effort in state waters was removed from the VTR summaries to avoid double counting of effort. Fishing effort in federal waters was reported in the VTRs and included Statistical Areas 625, 626, 631, and 632.[5] These statistical areas were also separated at 37 north latitude. Areas 625 and 631 were adjacent to the Virginia shore, had an eastern extent of 75 west longitude, and extended in a north-south direction one degree of latitude (Figure1). Statistical areas 632 and 626 were the one-degree square eastern counterparts of Areas 631 and 625.

The VMRC and VTR data were further stratified by gear type. Within each stratum (year, week, region, gear type) the number of trips and total landings were summed. Both fishing trips and landings were investigated because trips were not always comparable across gear types. For example, the purse seine fishery had very few trips but a large amount of landings, whereas the handline fishery had numerous trips but comparatively few landings.

It was not possible to stratify purse seine fishing effort by the same strata as the rest of the data because:

- limited fishing location data were available in the CFDBS, and
- trips tended to be longer than one week, making it inappropriate to bin the trips into weeks as done with the other fisheries data.

Instead, purse seine effort was spatially divided into bay and ocean strata, and all recorded trips during May through July in a single year were grouped into one time period representing the study period for that year.

[4] Given numerous unknowns after a turtle death (e.g.. buoyancy of a dead turtle over time, tidal currents, large scale oceanographic currents, wind-driven movement, etc.; Mooreside 2000), it is extremely difficult to ascertain where a stranded turtle died.

[5] VTR effort analyzed in this paper is likely to be a slight underestimate of the true fishing effort. Some VTR records had missing latitude and longitude information, and therefore these records were not included in the analysis since it could not be determined where the fishing effort occurred. The VTR data for the Northeast region (US Atlantic waters north of North Carolina), had missing location information on 4.8%, 4.7%, and 5.25% of all recorded trips for 2001, 2002, and 2003, respectively. VTR data that was recorded as landed in Virginia had missing location information for 7.9%, 8.4%, and 11% of recorded trips for 2001, 2002, and 2003, respectively. Since records were selected by location instead of state, fishing effort within the study region could have been landed in other ports outside of Virginia. Therefore, the percentage of missing VTR location information is likely somewhere between the percentages for the whole Northeast VTR dataset and the percentages for Virginia.

Fishing effort by gear type was examined for patterns consistent with patterns in sea turtle strandings from early May through the last week of June. Correlation analysis was explored but was not included in this report. This and other similar types of statistical analysis were not appropriate because:

- there is an unknown probable temporal lag between a turtle death and its stranding,
- the location of a turtle death may be distant from its stranding location, and
- binned fishing effort may not represent the week of an interaction if a trip spanned weekly periods.

Instead, examination of fishing effort relative to turtle strandings was limited to comparative figures and tables. This analysis focused on the areas where most strandings occurred (SE, SW, NA, and SA areas).[6]

RESULTS

Virginia Sea Turtle Strandings

Loggerhead sea turtles accounted for 81% of all Virginia sea turtle strandings from 2001 to 2003 (Table 1). Kemp's ridleys accounted for 11% of total strandings, and green, leatherback, and unidentified turtles each constituted less than 4% of total strandings. More than 70% of the yearly strandings in Virginia occurred between May and July, with 49% in the month of June alone.

During the May to July period, strandings consistently peaked across years from early to mid June (Table 2). The vast majority of stranded turtles had body conditions classified as moderately or severely decomposed (category 3 or greater; Swingle et al. 2004). Total strandings for the peak months were greatest in the SE, SW, and NA in decreasing order (Table 2). In two of the three years, the SE had the most strandings followed by the SW, and in 2002 the NA region had the most strandings (Table 3). Strandings along Virginia's ocean coastline (NA and SA) were also relatively high in some years. Northern regions of the Chesapeake Bay had considerably fewer reported strandings than other regions.[7]

VMRC Fisheries Effort - State Waters

During the May to July period in 2001-2003, commercial fishery harvests from the Chesapeake Bay and Virginia ocean state waters totaled 14.1, 14.8 and 12.7 million pounds,

[6] If interactions are found to be gear-specific in state waters, the same interactions are likely to occur in sections of the Bay not analyzed and sampling methods could be transferred to these regions.

[7] Strandings data are considered opportunistic data. The Virginia sea turtle strandings network systematically surveys various sections of the coastline for strandings, but other areas are surveyed irregularly and strandings are often reported to the stranding network by the public. Thus, effort across shorelines is not standardized and differences in the timing of reported strandings could be due to the amount of public visitation to a particular shoreline; that is, the NW may have a lower level of strandings than other regions in part because less effort (or visitation) takes place in this region. Also, the date when a turtle is found may not represent the date on which it washed up on shore, and the turtle's condition may depend on how long it has been on land before it was detected.

respectively (Table 4). Six types of gear accounted for 95% of the catch from state waters: pot gear (34%), pound nets (27%), anchored gillnets (13%), haul seines (10%), drift gillnets (6%), and pealer pots (5%). Those same gear types accounted for 85% of the trips: pot gear (45%), pound nets (5%), anchored gillnets (6%), haul seines (1%), drift gillnets (2%), and pealer pots (25%).

State water landings and number of trips were higher inside the Chesapeake Bay (92% to 95% of VMRC totals) than outside (5%-8% of VMRC totals; Tables 4 and 5). Pot and pound net gear accounted for the majority of landings and trips in the NE and NW areas of the Bay. In the SE and SW areas of the Bay, anchored and drift gillnet, pots, haul seines, and pound nets caught the majority of catch; however, pot gear and pat and tong fishing accounted for the majority of the trips. The major distinction between these two southern regions is that haul seine gear was fished almost exclusively in the SW and accounted for approximately 10% of the total catch in this region. In the NA and SA regions, gillnets and pot gear contributed significant amounts of landings and trips, particularly along the northern shore.

The largest differences between the amount of landings and the amount of effort (e.g. number of trips) occurred in the haul seine, crab pound net, scrap rake, and pat and tong fisheries (Tables 4 and 5). The haul seine fishery had large landings with few trips, while the other fisheries had low landings and many trips.

VTR Fisheries Effort - Federal Waters

During May through July 2001-2003, the majority (80-85%) of the catch in Federal waters (Fig. 2-4) was landed in the following gear: scallop dredge, scallop trawl, bottom fish otter trawl, mid-water trawl, and gillnet gear (in Statistical Areas 625, 626, and 632). Area 631 contributed little to the overall catch. However, these same gear types only comprised 40% of all trips. Handline accounted for an additional 35% of all trips, but only 2% of landings (Tables 6 and 7).

The bottom otter trawl fishery had the highest landings in 2001 and 2003 when it accounted for 40% and 57%, respectively, of the total annual landings. In 2001 and 2002, the majority of landings were in Area 626 (83% and 87%), while in 2003 the majority of landings were split between Areas 626 (48%) and 632 (43%; Table 6).

Scallop dredge gear was second in terms of landings during 2001-2003. Scallop dredge and trawl effort were both primarily located in offshore Area 626 (Tables 6-7; Fig. 2-4).

Most gillnet gear was fished in Area 625, although the number of gillnet trips in Area 626 increased in 2003 relative to previous years (Tables 6-7; Fig 2-4). Gillnets accounted for between 4 and 10% of the study area's annual landings during 2001-2003 (Table 6). The majority of landings from Area 625 in all three years was from gillnets, and Area 625 had the most gillnet trips in all years except 2002 (Table 6 and 7).

Large differences were detected between the amount of trips and landings, by gear type. This scenario applies to handlines, sink gillnet, and fish pots. In these fisheries, total number of fishing trips may be a more appropriate measure of activity than total amount of catch.

Purse Seine Effort - Commercial Fisheries Database System

The purse seine fishery was the only fishery assessed using the CFDBS data because landings from this fishery are not recorded in the VTR or VMRC databases. Purse seine fishing in the study region and time period consisted of a limited number of multi-day trips, but a large amount of landings (Table 8). During 2001-2003, 88% of purse seine landings occurred inside Chesapeake Bay.

Sea Turtle Strandings Relative to Fisheries Effort

There were no consistent patterns in fishing effort that corresponded to peaks in turtle strandings. Although gillnet landings often peaked at the same time as peaks in strandings (Fig. A1, panel 3) or just before peaks in strandings (Fig. A2, panels 2 and 3), this was not a consistent phenomenon. Similar patterns are also seen among gillnet trips (Fig. A11, panel 2, Fig. A12, panel 3, and Fig. A15, panel 2), though again, this was not consistent. As discussed previously, analyses beyond illustrating the basic patterns in the data were not possible due to probable spatial and temporal inaccuracies in the data.

Development of Sampling Plan to Allocate Observer Coverage

Three different plans for allocating observer coverage were developed based on varying levels (and cost) of observer effort (Table 9). These plans differed in the sampling period and number of sampling days, but all allocated observer effort in proportion to fishing effort at the 10% level. Each plan sampled gillnets, haul seines, scallop trawls, and fish trawls. Gillnets and haul seines are included for sampling in Virginia state waters, and gillnets, scallop trawls and fish trawls are proposed for sampling in federal waters.

Plan 1 deploys observers during May through July and requires 205 sea days. Plan 2 has observer coverage from mid-May to the end of June and requires 121 sea days.[8] Finally, Plan 3 deploys observers only in June (the peak month for strandings) and requires 69 sea days.

Observer coverage in the gillnet fishery accounts for most of the proposed sampling days (87% in plans 1 and 2 and 90% in plan 3). More than 89% of the proposed sampling days in the Chesapeake Bay and state waters are in the gillnet fishery, and about 60% of the observer coverage in federal waters is in the gillnet fishery. Sampling inside the Bay accounts for about 60% of all sampling; sampling in state waters account for about 25%; and sampling in federal waters accounts for between 10% and 14% of the total proposed observer coverage. These percentages vary slightly by plan because of different time periods are covered, but sampling days are largely distributed in similar proportions across all plans.

Plan 1 would observe both the peak and tails of the turtle stranding distribution, while providing some cushion if the peak shifts in time. Plans 2 and 3 cover 82% and 75%, respectively, of the historical turtle bycatches during the May-July time period. However, for the fisheries being observed, only 58% and 32% of the effort occurs during the time periods of

[8] One observer sea day cost approximately $1,150 in FY2006. Therefore, 121 sea days requires a budget of $139,150.

plans 2 and 3, respectively. Plans 2 and 3 reduce observer cost but may miss the peak turtle strandings period due to inter-annual variability of turtle residence in the area.

DISCUSSION

Sea turtles typically arrive in the Chesapeake Bay in late May and early June (Mansfield et al. 2002). Patterns in fishing effort and strandings data suggest that specific possible fisheries should be systematically sampled for evidence of interactions. Documentation of the fishing effort during the general time and area of high levels of stranded turtles provides a starting point to develop a systematic sampling plan; however, it is only a starting point for several reasons. First, stranding patterns and fishing activity were not consistent across the three years examined. Second, the commercial fishery landings data were binned by week according to when a vessel returned to the port and landed its catch. This binning may have obscured the relationship between fishing effort and strandings as fish caught at sea in one week could have been landed the following week. Third, a turtle interaction may occur in one week, and the turtle could then float a great distance and land on a distant beach a week or two later far away from the time and location of the actual fishery interaction. For example, a turtle interaction could occur along the southern Atlantic coast of Virginia and be carried by tides into the Bay. Finally, several fisheries/gears may contribute to the pattern of sea turtle strandings, with no single fishery responsible for the majority of the strandings.

These difficulties illustrate the need for observer data. Using observer data to examine sea turtle-fishery interactions would be far more straightforward. Commercial fishing data would not have to be binned since the exact location and time of the interaction would be known. Also, observing an interaction would take away the guesswork and inaccuracies involved in trying to estimate when and where a stranded turtle may have interacted with a particular fishery.

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Table 1. 2001 to 2003 Virginia sea turtle strandings (# of turtles) by month and species

	MONTH													
SPECIES	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Totals**	**Total %**
Loggerhead	5		2	3	125	524	118	79	73	52	49	4	1,034	80.78%
Green	2		1			2	1	1		2	4	2	15	1.17%
Leatherback					2	12	5	5	11	1	4		40	3.13%
Kemps Ridley		1	3		34	61	9	3	7	11	11	2	142	11.09%
Unknown	1	1			3	24	5	3	7	4	1		49	3.83%
Totals	8	2	6	3	164	623	138	91	98	70	69	8	1,280	100.00%
Total %	0.63%	0.16%	0.47%	0.23%	12.81%	48.67%	10.78%	7.11%	7.66%	5.47%	5.39%	0.63%	100.00%	

Table 2. 2001-2003 May to July Virginia sea turtle strandings (# of turtles) by region and week (week 1 has 6 days and week 13 has 10 days)

Date of Week	**Week**	**NA**	**NE**	**NW**	**SA**	**SE**	**SW**	**Total**	**Total %**
5/1 to 5/5	1	1			1	3	2	7	0.76%
5/6 to 5/12	2	1			10	3	3	17	1.84%
5/13 to 5/19	3	4				6	2	12	1.30%
5/20 to 5/26	4	3		9	12	12	19	55	5.95%
5/27 to 6/2	5	29		6	10	39	31	115	12.43%
6/3 to 6/9	6	37	6	6	9	81	24	163	17.62%
6/10 to 616	7	20	4	9	7	59	29	128	13.84%
6/17/ to 6/23	8	30	2	22	40	37	51	182	19.68%
6/24 to 6/30	9	17	17	2	16	27	29	108	11.68%
7/1 to 7/7	10	15	5	4	6	9	6	45	4.86%
7/8 to 7/14	11	5	6	1	10	3	7	32	3.46%
7/15/ to 7/21	12	9	1		6	3	8	27	2.92%
7/22 to 7/31	13	7			9	8	10	34	3.68%
Totals		178	41	59	136	290	221	925	100.00%
Total %		19.24%	4.43%	6.38%	14.70%	31.35%	23.89%	100.00%	

Table 3. May to July Virginia sea turtle strandings (# of turtles) by region and year

YEAR	NA	NE	NW	SA	SE	SW	Total	Total %
2001	64	10	21	26	112	74	307	33.19%
2002	73		16	45	47	47	228	24.65%
2003	41	31	22	65	131	100	390	42.16%
Totals	178	41	59	136	290	221	925	100.00%
Total %	19.24%	4.43%	6.38%	14.70%	31.35%	23.89%	100.00%	

Table 4. 2001-2003 May to July VMRC recorded fishing landings by region and gear type

	Gear		Landings		Water Body					
Year	Gear Abbreviation	Gear Name	Total lbs of Landings	Total % of Landings	NA	NE	NW	SA	SE	SW
2001	AGN	Anchored Gill Net	1,534,019	10.90%	1.36%	2.31%	0.97%	0.38%	3.86%	2.03%
	DGN	Drift Gill Net	972,280	6.91%	0.53%	2.36%		0.00%	3.85%	0.17%
	HS	Haul Seine	1,362,328	9.68%	0.10%		0.99%		0.00%	8.59%
	PN	Pound Net	4,119,519	29.28%		1.41%	15.93%		6.51%	5.44%
	PNC	Pound Net Crab	45,801	0.33%		0.12%	0.13%		0.04%	0.04%
	POT	Pot	4,686,216	33.31%	1.29%	7.41%	4.70%	0.06%	6.13%	13.72%
	PPOT	Pealer Pot	853,888	6.07%	0.06%	3.49%	0.48%		1.36%	0.68%
	PT	Pat & Tong (clams)	53,472	0.38%			0.04%		0.23%	0.11%
	SCR	Scrap (rake type)	171,339	1.22%		1.19%	0.00%		0.03%	0.00%
	Other	Other	270,433	1.92%	0.52%	0.11%	0.02%	0.35%	0.61%	0.32%
	2001 Total		14069295	100.00%	3.84%	18.40%	23.25%	0.78%	22.61%	31.11%
2002	AGN	Anchored Gill Net	1,582,411	10.72%	2.04%	3.83%	0.66%	0.38%	2.18%	1.64%
	DGN	Drift Gill Net	986,442	6.69%	0.26%	2.69%	0.09%	0.00%	3.57%	0.07%
	HS	Haul Seine	1,614,629	10.94%	0.09%		1.69%		0.00%	9.17%
	PN	Pound Net	3,714,029	25.17%		1.26%	14.39%		7.04%	2.49%
	PNC	Pound Net Crab	19,574	0.13%		0.05%	0.06%		0.01%	0.01%
	POT	Pot	5,717,639	38.75%	0.94%	10.12%	7.35%		8.30%	12.04%
	PPOT	Pealer Pot	823,363	5.58%	0.05%	2.74%	1.43%		0.78%	0.57%
	PT	Pat & Tong (clams)	41,253	0.28%			0.01%		0.19%	0.08%
	SCR	Scrap (rake type)	121,513	0.82%		0.82%			0.00%	0.00%
	Other	Other	135,173	0.92%	0.22%	0.26%	0.01%	0.10%	0.20%	0.13%
	2002 Total		14756026	100.00%	3.60%	21.78%	25.68%	0.48%	22.27%	26.19%
2003	AGN	Anchored Gill Net	2,183,224	17.21%	4.49%	2.97%	3.40%	1.07%	3.31%	1.97%
	DGN	Drift Gill Net	660,202	5.20%	0.16%	1.98%	0.06%	0.00%	2.84%	0.16%
	HS	Haul Seine	1,299,733	10.25%	0.01%		0.29%		0.08%	9.86%
	PN	Pound Net	3,378,625	26.63%		0.64%	15.90%		5.55%	4.54%
	PNC	Pound Net Crab	114,453	0.90%		0.08%	0.13%		0.67%	0.02%
	POT	Pot	4,066,236	32.06%	1.16%	9.06%	5.33%	0.01%	7.48%	9.01%
	PPOT	Pealer Pot	629,414	4.96%	0.10%	3.22%	0.41%		0.83%	0.40%
	PT	Pat & Tong (clams)	41,922	0.33%			0.01%		0.17%	0.15%
	SCR	Scrap (rake type)	67,630	0.53%		0.53%			0.01%	0.00%
	Other	Other	243,644	1.92%	0.14%	0.32%	0.03%	0.43%	0.67%	0.32%
	2003 Total		12,685,083	100.00%	6.06%	18.80%	25.57%	1.51%	21.61%	26.45%

Table 5. 2001-2003 May to July VMRC recorded fishing trips by region and gear type

	Gear		Total Trips		Water Bodies					
Year	Gear Abbreviation	Gear Name	Total # of Trips	Total % of Trips	NA	NE	NW	SA	SE	SW
2001	AGN	Anchored Gill Net	1,943	5.69%	0.64%	0.58%	1.02%	0.22%	1.39%	1.84%
	DGN	Drift Gill Net	568	1.66%	0.47%	0.54%			0.55%	0.10%
	HS	Haul Seine	226	0.66%	0.21%	0.00%	0.06%	0.00%	0.00%	0.38%
	PN	Pound Net	1,046	3.06%		0.17%	1.78%		0.76%	0.36%
	PNC	Pound Net Crab	789	2.31%		0.74%	0.93%		0.19%	0.45%
	POT	Pot	14,934	43.73%	1.93%	8.51%	10.03%	0.06%	7.84%	15.36%
	PPOT	Pealer Pot	8,352	24.45%	0.20%	13.71%	3.13%		5.11%	2.30%
	PT	Pat & Tong (clams)	1,534	4.49%			0.48%		2.46%	1.55%
	SCR	Scrap (rake type)	3,431	10.05%		9.89%	0.01%		0.13%	0.02%
	Other	Other	1,331	3.90%	1.17%	0.20%	0.07%	0.21%	1.10%	1.14%
	2001 Total		34,154	100.00%	4.62%	34.33%	17.51%	0.49%	19.53%	23.51%
2002	AGN	Anchored Gill Net	1,786	5.67%	1.01%	0.92%	0.85%	0.07%	0.89%	1.94%
	DGN	Drif Gill Net	594	1.88%	0.41%	0.67%	0.10%	0.01%	0.68%	0.02%
	HS	Haul Seine	178	0.56%	0.13%		0.06%		0.01%	0.36%
	PN	Pound Net	1,063	3.37%		0.21%	2.15%		0.71%	0.30%
	PNC	Pound Net Crab	463	1.47%		0.31%	0.77%		0.06%	0.33%
	POT	Pot	15,365	48.76%	1.75%	10.11%	12.52%		9.84%	14.54%
	PPOT	Pealer Pot	7,196	22.84%	0.24%	15.00%	2.84%		3.16%	1.60%
	PT	Pat & Tong (clams)	1,141	3.62%			0.11%		2.30%	1.21%
	SCR	Scrap (rake type)	2,602	8.26%		8.21%			0.04%	0.00%
	Other	Other	1,125	3.57%	1.43%	0.45%	0.04%	0.13%	0.72%	0.78%
	2002 Total		31,513	100.00%	4.97%	35.89%	19.43%	0.21%	18.41%	21.08%
2003	AGN	Anchored Gill Net	2,181	7.60%	1.18%	0.92%	1.89%	0.25%	1.15%	2.21%
	DGN	Drift Gill Net	384	1.34%	0.28%	0.51%	0.01%		0.45%	0.08%
	HS	Haul Seine	163	0.57%	0.08%		0.03%		0.04%	0.43%
	PN	Pound Net	990	3.45%		0.18%	2.02%		0.89%	0.36%
	PNC	Pound Net Crab	627	2.19%		0.48%	0.99%		0.31%	0.41%
	POT	Pot	12,702	44.29%	2.08%	9.22%	11.31%	0.01%	8.87%	12.80%
	PPOT	Pealer Pot	7,619	26.56%	0.50%	16.86%	3.02%		3.87%	2.32%
	PT	Pat & Tong (clams)	1,217	4.24%			0.11%		2.23%	1.90%
	SCR	Scrap (rake type)	1,700	5.93%		5.83%			0.07%	0.02%
	Other	Other	1,099	3.83%	0.94%	0.41%	0.24%	0.35%	0.94%	0.94%
	2003 Total		28,682	100.00%	5.05%	34.42%	19.62%	0.61%	18.83%	21.47%

Table 6. 2001-2003 May to July VTR recorded fishing landings outside of state waters by region and gear type

	Gear		Total Trips		Statistical Areas			
Year	Gear Abbreviation	Gear Name	Total # of Landings	Total % of Landings	625	626	631	632
2001	DRS	Scallop Dredge	998,756	17.32%		16.73%		0.59%
	GNS	Sink Gill Net	510,129	8.85%	7.29%	0.52%	1.04%	
	HND	Hand Line	95,693	1.66%	0.42%	0.29%	0.86%	0.10%
	OTC	Scallop Otter Trawl	515,684	8.94%	0.19%	8.75%		
	OTF	Bottom Fish Otter Trawl	3,267,531	56.67%		54.23%		2.43%
	OTM	Mid-water Otter Trawl						
	PTC	Crab Pot	64,331	1.12%		1.09%	0.03%	
	PTF	Fish Pot	172,439	2.99%	1.24%	0.65%	1.02%	0.08%
	PTL	Lobster Pot	36,981	0.64%		0.64%		
	PTM	Midwater Pair Trawl						
	PTW	Conch/Whelk Pot	43,810	0.76%	0.70%	0.01%	0.05%	
	Other		61,035	1.06%	0.60%	0.37%	0.09%	
	2001 Total		5,766,389	100.00%	10.44%	83.28%	3.08%	3.20%
2002	DRS	Scallop Dredge	1,402,429	30.96%	0.06%	29.53%	0.57%	0.81%
	GNS	Sink Gill Net	186,287	4.11%	2.26%	1.39%	0.45%	
	HND	Hand Line	72,127	1.59%	0.24%	0.21%	0.70%	0.44%
	OTC	Scallop Otter Trawl	1,120,276	24.73%	0.02%	24.68%	0.02%	0.01%
	OTF	Bottom Fish Otter Trawl	1,076,063	23.75%		21.70%	0.02%	2.04%
	OTM	Mid-water Otter Trawl						
	PTC	Crab Pot	294,293	6.50%	0.24%	6.03%	0.22%	
	PTF	Fish Pot	217,333	4.80%	1.93%	1.35%	1.32%	0.20%
	PTL	Lobster Pot	53,539	1.18%		1.16%		0.02%
	PTM	Mid-water Pair Trawl						
	PTW	Conch/Whelk Pot	59,505	1.31%	1.11%		0.21%	
	Other		48,660	1.07%	0.18%	0.81%	0.08%	0.00%
	2002 Total		4,530,512	100.00%	6.04%	86.86%	3.58%	3.52%
2003	DRS	Scallop Dredge	2,060,091	23.85%		23.85%		
	GNS	Sink Gill Net	770,386	8.92%	4.42%	4.15%	0.35%	
	HND	Hand Line	92,036	1.07%	0.20%	0.45%	0.39%	0.03%
	OTC	Scallop Otter Trawl	366,106	4.24%	1.23%	2.06%	0.94%	
	OTF	Bottom Fish Otter Trawl	3,455,540	40.00%	0.04%	12.86%	0.06%	27.04%
	OTM	Mid-water Otter Trawl	1,268,309	14.68%				14.68%
	PTC	Crab Pot	184,460	2.14%		1.39%		0.75%
	PTF	Fish Pot	151,405	1.75%	1.00%	0.38%	0.18%	0.20%
	PTL	Lobster Pot	40,106	0.46%	0.01%	0.45%		
	PTM	Mid-water Pair Trawl	190,000	2.20%		2.20%		
	PTW	Conch/Whelk Pot	40,883	0.47%	0.22%	0.26%		
	Other		18,463	0.21%	0.03%	0.00%	0.18%	
	2003 Total		8,637,785	100.00%	7.15%	48.05%	2.10%	42.70%

Table 7. 2001-2003 May to July VTR recorded fishing trips outside of state waters by region and gear type

	Gear		Total Trips		Statistical Areas			
Year	Gear Abbreviation	Gear Name	Total # of Trips	Total % of Trips	625	626	631	632
2001	DRS	Scallop Dredge	64	5.15%		4.99%		0.16%
	GNS	Sink Gill Net	279	22.45%	19.23%	1.45%	1.77%	
	HND	Hand Line	491	39.50%	13.92%	7.56%	16.41%	1.61%
	OTC	Scallop Otter Trawl	56	4.51%	0.40%	4.10%		
	OTF	Bottom Fish Otter Trawl	33	2.65%		2.17%		0.48%
	OTM	Mid-water Otter Trawl						
	PTC	Crab Pot	2	0.16%		0.08%	0.08%	
	PTF	Fish Pot	199	16.01%	7.08%	3.06%	5.55%	0.32%
	PTL	Lobster Pot	38	3.06%		3.06%		
	PTM	Mid-water Pair Trawl						
	PTW	Conch/Whelk Pot	53	4.26%	3.86%	0.08%	0.32%	
	Other		28	2.25%	1.53%	0.16%	0.56%	
	2001 Totals		1,243	100.00%	46.02%	26.71%	24.70%	2.57%
2002	DRS	Scallop Dredge	93	8.80%	0.09%	8.23%	0.28%	0.19%
	GNS	Sink Gill Net	107	10.12%	6.53%	2.46%	1.14%	
	HND	Hand Line	429	40.59%	7.66%	13.06%	12.39%	7.47%
	OTC	Scallop Otter Trawl	126	11.92%	0.09%	11.54%	0.19%	0.09%
	OTF	Bottom Fish Otter Trawl	19	1.80%		1.32%	0.19%	0.28%
	OTM	Mid-water Otter Trawl						
	PTC	Crab Pot	21	1.99%	0.76%	0.38%	0.85%	
	PTF	Fish Pot	164	15.52%	6.62%	3.60%	4.73%	0.57%
	PTL	Lobster Pot	46	4.35%		4.26%		0.09%
	PTM	Mid-water Pair Trawl						
	PTW	Conch/Whelk Pot	40	3.78%	2.93%		0.85%	
	Other		12	1.14%	0.47%	0.19%	0.28%	0.19%
	2002 Totals		1,057	100.00%	25.17%	45.03%	20.91%	8.89%
2003	DRS	Scallop Dredge	128	9.82%		9.82%		
	GNS	Sink Gill Net	282	21.64%	12.97%	8.14%	0.54%	
	HND	Hand Line	429	32.92%	11.28%	5.99%	12.13%	3.53%
	OTC	Scallop Otter Trawl	138	10.59%	0.84%	8.44%	1.30%	
	OTF	Bottom Fish Otter Trawl	124	9.52%	0.31%	7.67%	0.38%	1.15%
	OTM	Midwater Otter Trawl	2	0.15%				0.15%
	PTC	Crab Pot	3	0.23%		0.15%		0.08%
	PTF	Fish Pot	120	9.21%	4.53%	2.07%	1.77%	0.84%
	PTL	Lobster Pot	38	2.92%	0.15%	2.76%		
	PTM	Midwater Pair Trawl	2	0.15%		0.15%		
	PTW	Conch/Whelk Pot	26	2.00%	1.15%	0.84%		
	Other		11	0.84%	0.15%	0.08%	0.61%	
	2003 Totals		1,303	100.00%	31.39%	46.12%	16.73%	5.76%

Table 8. 2001-2003 May-July Recorded Purse Seine Effort in State and Federal Waters

Year	Ocean/Bay	Trips	Tons
2001	bay	3	58,910
2001	ocean	1	7,998
2002	bay	3	35,600
2002	ocean	3	7,920
2003	bay	3	42,005
2003	ocean	2	3,470
Totals		15	155,903

Table 9. Trips by region and statistical area, and sampling days as a percentage of trips.

Week		Week	Chesapeake Bay State (SE and SW)		Ocean Side State (NA and SA)		Ocean Side Federal (SA 625 and 631)			CB and Ocean
Begin	End	Number	Gillnet	Haul S.	Gillnet	Haul S.	Gillnet	Scallop Tr.	Fish Tr.	Total
29-Apr	5-May	1	76	6	46	1	37	2	0	168
6-May	12-May	2	123	5	67	4	37	6	0	242
13-May	19-May	3	78	7	41	4	16	2	0	148
20-May	26-May	4	78	9	57	3	20	5	1	173
27-May	2-Jun	5	96	13	58	2	25	5	2	201
3-Jun	9-Jun	6	94	14	45	1	10	4	2	170
10-Jun	16-Jun	7	99	17	43	1	9	6	2	177
17-Jun	23-Jun	8	100	8	40	1	7	2	2	160
24-Jun	30-Jun	9	83	5	41	1	11	3	3	147
1-Jul	7-Jul	10	53	9	18	1	5	2	0	88
8-Jul	14-Jul	11	53	11	14	1	2	3	0	84
15-Jul	21-Jul	12	80	13	3	1	1	4	0	102
21-Jul	30-Jul	13	104	16	17	1	0	2	0	140
Total (Trips)	All Weeks		1,117	133	490	22	180	46	12	2,000
	Weeks 3-9		628	73	325	13	98	27	12	1,176
	Weeks 6-9		376	44	169	4	37	15	9	654
	DA/Trip		1	1	1	1	1	2	2	
Sampling Days	All Weeks	10%	112	13	49	2	18	9	2	205
	Weeks 3-9	10%	63	7	33	1	10	5	2	121
	Weeks 6-9	10%	38	4	17	0	4	2	1	65

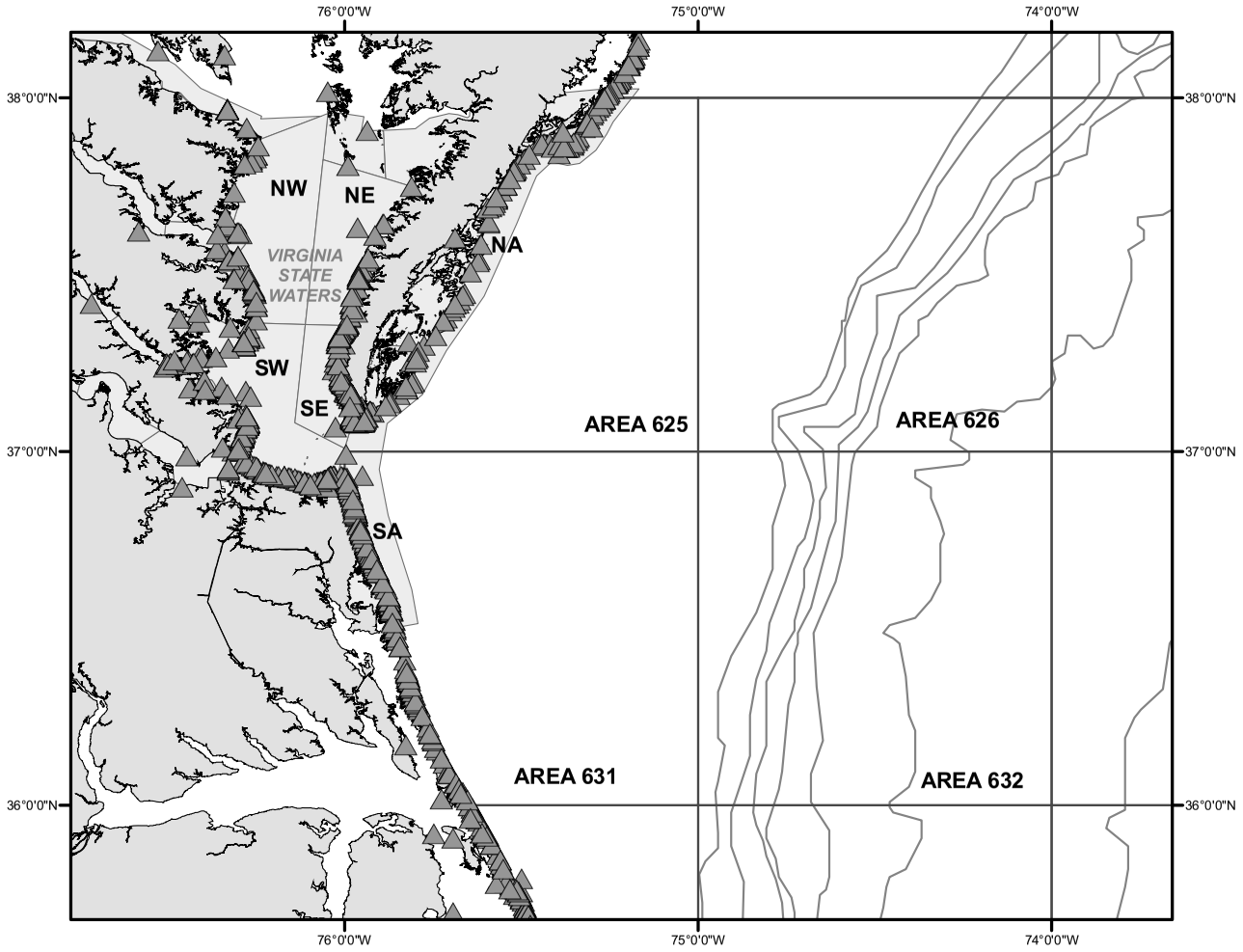


Figure 1. Virginia study area depicting VTR statistical areas (625, 631, 632, and 626), state water bodies (NW, NE, SW, SE, NA, and SA), and 2001-2003 May-July VA sea turtle strandings.

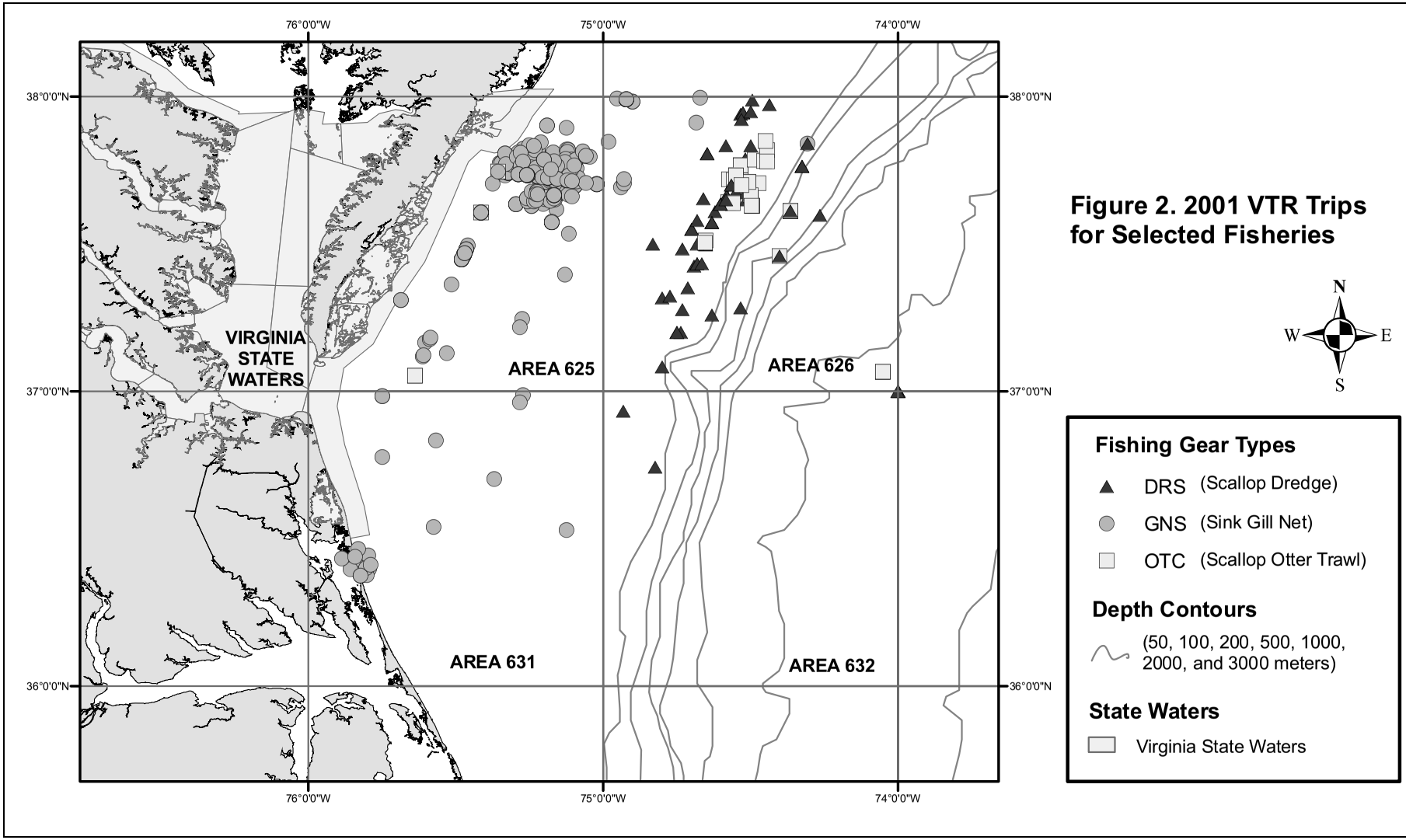


Figure 2. 2001 VTR Trips for Selected Fisheries

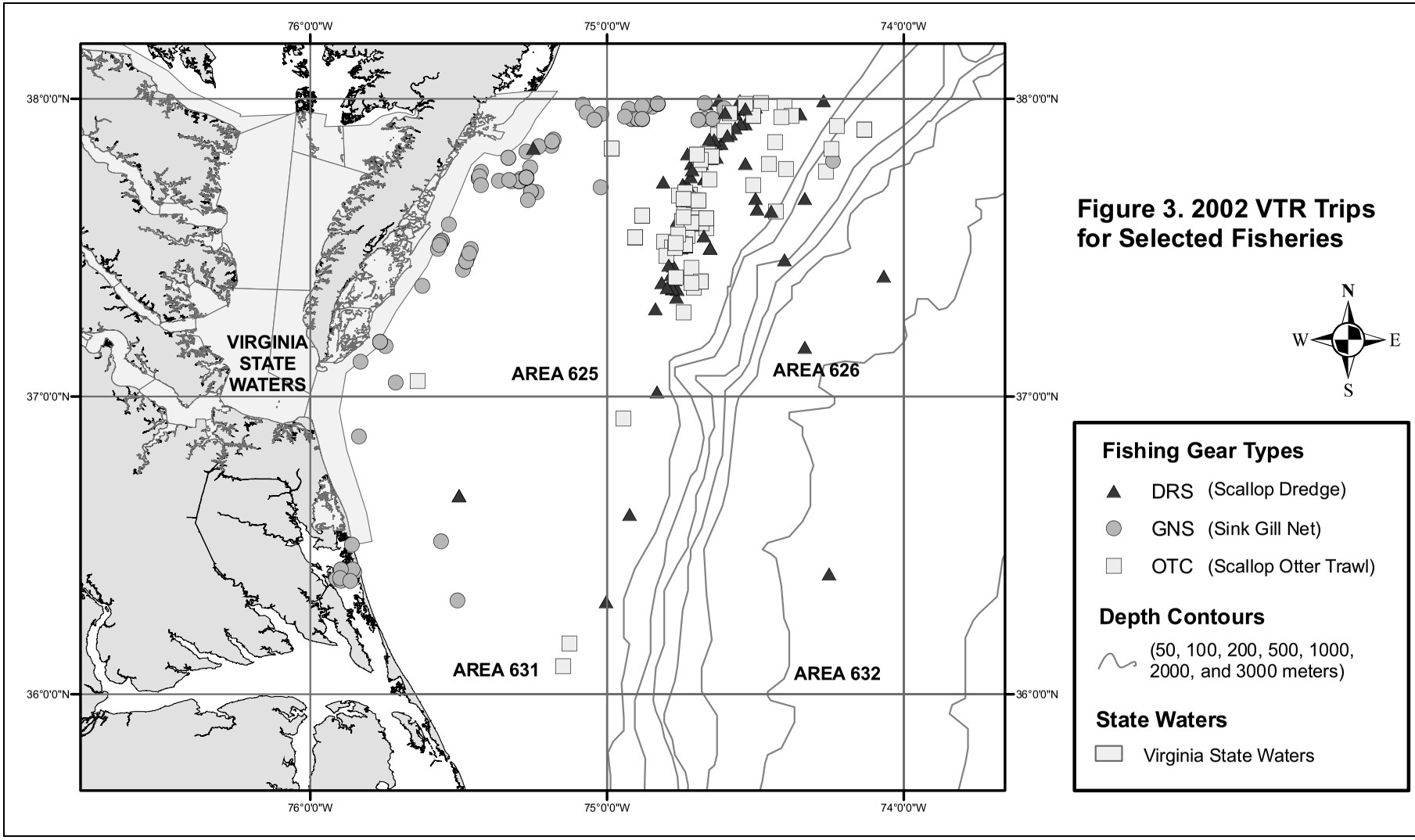


Figure 3. 2002 VTR Trips for Selected Fisheries

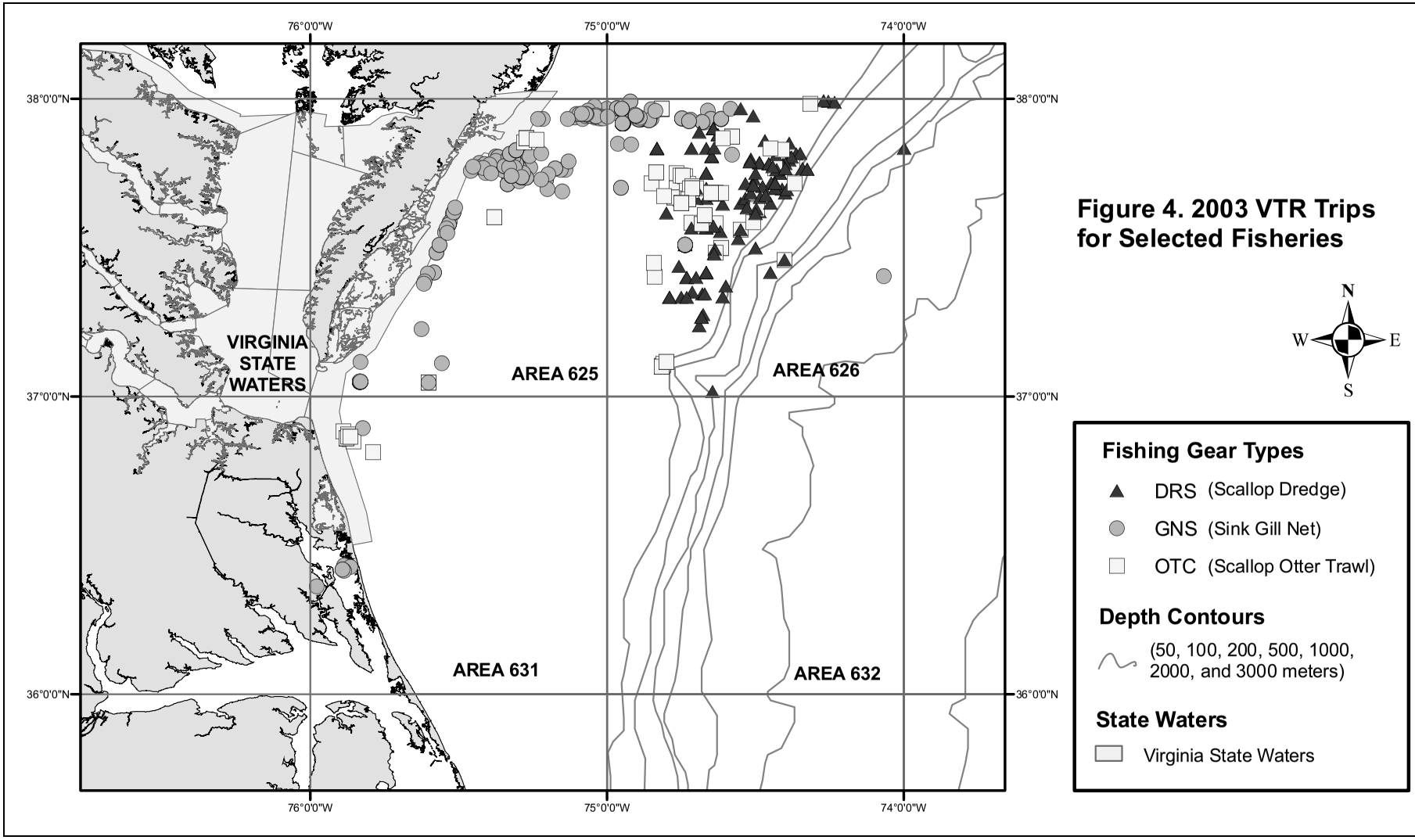


Figure 4. 2003 VTR Trips for Selected Fisheries

APPENDIX

Table A1. 2001 May-July VMRC Trips and Turtle Strandings (# of turtles) by Week and Water Body

	Water		Gear Abbreviations											Turtle
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2001	NA	1	25	7	5			25	4			23	89	
		2	32	13	5			19	22			29	120	
		3	26	13	3			23	32			42	139	
		4	16	14	4			32	12			41	119	
		5	20	15	5			60				36	136	16
		6	21	18	5			70				30	144	12
		7	16	13	5			65				27	126	13
		8	18	13	2			72				34	139	13
		9	12	10	1			72				18	113	3
		10	4	11	8			59				30	112	4
		11	12	9	9			52				32	114	1
		12	5	10	8			50				36	109	1
		13	10	13	13			60				22	118	1
	NA Total		217	159	73			659	70			400	1578	64
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2001	NE	1	31			7	29	154	175		10	2	408	
		2	30	3		6	31	186	413		122	3	794	
		3	13	9		7	24	164	563		185	8	973	
		4	17	3		6	10	150	487		124	12	809	
		5	20	7		6	10	156	368		108	8	683	
		6	17	7		4	13	163	318		296	6	824	6
		7	14	17		2	13	193	361		378	4	982	4
		8	11	26		4	12	230	337		330	3	953	
		9	8	12		3	19	245	302		298	2	889	
		10	11	26		3	21	291	275		329	1	957	
		11	15	28		3	21	302	316		374	5	1064	
		12	6	23		3	21	296	330		366	5	1050	
		13	4	25		3	29	376	436		457	10	1340	
	NE Total		197	186		57	253	2906	4681		3377	69	11726	10
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2001	NW	1	22		1	53	33	170	54	11		5	349	
		2	28		1	52	46	193	118	12		4	454	
		3	18			58	36	193	171	12		2	490	
		4	19		1	51	29	193	167	9		1	470	3
		5	26		2	50	25	252	117	6		3	481	4
		6	29		2	46	25	272	52	4		1	431	2
		7	22		1	46	22	310	50	6		0	457	3
		8	29		2	49	22	310	41	12		1	466	6
		9	24		1	44	18	312	46	21		2	468	2
		10	23		2	39	14	315	46	14		1	454	1
		11	37		3	38	14	288	56	20		1	457	
		12	34		4	37	13	264	60	17	1	1	431	
		13	39		2	46	19	355	90	20	1	2	574	
	NW Total		350		22	609	316	3427	1068	164	2	24	5982	21

Table A1 (cont.). 2001 May-July VMRC Trips and Turtle Strandings (# of turtles) by Week and Water Body

Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2001	SA	1	14									7	21	
		2	19									11	30	
		3	11									18	29	
		4	5									9	14	1
		5	7									9	16	1
		6	2									5	7	3
		7												1
		8	1									2	3	4
		9												6
		10	1					4				5	10	2
		11	4					4				2	10	3
		12	3					5				3	11	1
		13	7					6				2	15	4
	SA Total		74					19				73	166	26
Year	**Body**	**Week**	**AGN**	**DGN**	**HS**	**PN**	**PNC**	**POT**	**PPOT**	**PT**	**SCR**	**Other**	**Total**	**Strandings**
2001	SE	1	27			11	18	155	140	63		16	430	
		2	37			24	16	175	208	74		26	560	
		3	23	6		25		220	178	79		45	576	1
		4	44	9		22		219	136	92		41	563	4
		5	44	8		19		197	128	89		31	516	15
		6	65	15		26	3	171	123	62		30	495	59
		7	41	23		20	3	163	119	50	3	27	449	25
		8	37	20		20	7	188	112	59	9	28	480	2
		9	23	16	1	17	6	199	111	67	7	28	475	1
		10	28	24		21	4	230	114	45	6	33	505	1
		11	36	28		16	2	237	118	59	7	29	532	
		12	40	24		16	2	235	110	54	6	23	510	
		13	30	16		21	4	288	149	46	7	19	580	4
	SE Total		475	189	1	258	65	2677	1746	839	45	376	6671	112
Year	**Body**	**Week**	**AGN**	**DGN**	**HS**	**PN**	**PNC**	**POT**	**PPOT**	**PT**	**SCR**	**Other**	**Total**	**Strandings**
2001	SW	1	60	5	8	9	13	320	79	41		31	566	
		2	61	5	11	16	22	348	205	36		36	740	
		3	59	1	7	9	13	369	186	32		33	709	
		4	46	4	12	8	11	420	65	31		48	645	5
		5	50	3	10	8	12	427	46	39		26	621	13
		6	66	4	7	7	18	397	43	47		27	616	13
		7	44		10	8	10	402	37	45		35	591	13
		8	54	3	11	9	9	454	30	41	1	28	640	6
		9	44		11	11	11	432	23	50	2	37	621	7
		10	29	1	7	9	9	422	14	39	1	20	551	
		11	41	2	13	11	9	402	14	47	1	35	575	3
		12	31	4	12	8	8	389	17	41	1	22	533	5
		13	45	2	11	9	10	464	28	42	1	11	623	9
	SW Total		630	34	130	122	155	5246	787	531	7	389	8031	74
2001 Total			1943	568	226	1046	789	14934	8352	1534	3431	1331	34154	307

Table A2. 2002 May-July VMRC Trips and Turtle Strandings (# of turtles) by Week and Water Body

	Water		Gear Abbreviations										Turtle
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2002	NA	1	16	10	3			9	23			30	91	1
		2	35	16	3			8	35			45	142	1
		3	21	8	3			34	13			36	115	4
		4	25	9				77	3			53	167	3
		5	33	10	1			74	1			33	152	10
		6	23	4	5			53				30	115	17
		7	31	2	4			45				35	117	6
		8	27	12	5			50				35	129	9
		9	28	11	10			49				26	124	8
		10	20	9	2			44				30	105	2
		11	19	8	2			40				32	101	3
		12	18	16	3			34				33	104	6
		13	21	15	1			34				34	105	3
	NA Total		317	130	42			551	75			452	1567	73
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2002	NE	1	23	2		6	15	81	287		56	16	486	
		2	55	7		7	11	110	461		144	19	814	
		3	27	2		7	7	99	315		111	12	580	
		4	42	5		7	7	180	338		42	17	638	
		5	28	8		6	7	204	317		78	11	659	
		6	12	20		7	7	249	300		224	7	826	
		7	13	25		8	7	279	309		229	14	884	
		8	9	26		4	7	302	334		244	5	931	
		9	6	28		2	7	277	332		239	5	896	
		10	20	19		3	4	330	372		252	9	1009	
		11	22	17		2	2	323	352		248	9	975	
		12	16	14		3	3	319	401		280	12	1048	
		13	17	37		4	15	433	610		440	7	1563	
	NE Total		290	210		66	99	3186	4728		2587	143	11309	
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2002	NW	1	9	2		29	30	103	97	8		0	278	
		2	26	1	2	63	34	230	175	10		2	543	
		3	15	5	3	54	28	241	134	2		1	483	
		4	22	5	1	51	24	347	67	3		1	521	5
		5	20	5	1	55	23	302	53	10		2	471	1
		6	12			52	15	326	35			4	444	3
		7	20	3	2	63	11	340	48			2	489	3
		8	23	1	2	59	12	347	46			0	490	3
		9	24	3	2	53	13	336	40			0	471	
		10	22	2	3	48	13	336	36			0	460	
		11	18	2	1	42	11	324	41			0	439	1
		12	26	2	1	43	12	298	46	1		0	429	
		13	30	1	1	64	16	416	76	1		1	606	
	NW Total		267	32	19	676	242	3946	894	35		13	6124	16

Table A2 (cont.). 2002 May-July VMRC Trips and Turtle Strandings (# of turtles) by Week and Water Body

Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2002	SA	1	6									6	12	1
		2	12	1								11	24	10
		3	1									6	7	
		4	1									6	7	7
		5	1									4	5	5
		6										2	2	
		7										3	3	2
		8												8
		9		1								2	3	
		10										2	2	
		11	1									0	1	7
		12												3
		13	1									0	1	2
	SA Total		23	2								42	67	45
Year	**Body**	**Week**	**AGN**	**DGN**	**HS**	**PN**	**PNC**	**POT**	**PPOT**	**PT**	**SCR**	**Other**	**Total**	**Strandings**
2002	SE	1	19	2		13	1	138	98	24	1	19	315	3
		2	36	12		17		227	109	45		22	468	3
		3	29	7		15		239	72	34		13	409	5
		4	43	10		21		233	91	47		18	463	6
		5	31	16		20		240	105	53		15	480	12
		6	20	13		25	1	231	81	47	1	10	429	6
		7	13	19	1	15	2	240	63	67	1	21	442	7
		8	14	24	2	16	2	234	63	50	1	17	423	1
		9	10	14		14	2	224	56	49	1	13	383	1
		10	13	32		20	2	271	50	70	3	27	488	1
		11	17	26		17	2	260	57	61	1	14	455	1
		12	12	12		14	2	241	69	66	3	18	437	
		13	22	27		18	5	322	82	111	2	21	610	1
	SE Total		279	214	3	225	19	3100	996	724	14	228	5802	47
Year	**Body**	**Week**	**AGN**	**DGN**	**HS**	**PN**	**PNC**	**POT**	**PPOT**	**PT**	**SCR**	**Other**	**Total**	**Strandings**
2002	SW	1	51	1	4	6	13	165	125	12		5	382	2
		2	100	3	9	14	13	269	148	28		13	597	3
		3	59		5	12	6	309	50	21		12	474	1
		4	76		7	8	8	382	32	33		15	561	11
		5	60		11	9	6	394	22	32		17	551	14
		6	33		8	8	5	392	18	24		19	507	3
		7	37		10	8	9	416	15	33		25	553	5
		8	30		9	8	8	393	15	28		23	514	3
		9	23		9	7	7	377	12	25		29	489	2
		10	39	1	11	4	7	365	15	18		28	488	
		11	29	1	7	5	5	357	13	27		12	456	2
		12	24		10	4	6	346	12	39		22	463	
		13	49		14	3	10	417	26	62	1	27	609	1
	SW Total		610	6	114	96	103	4582	503	382	1	247	6644	47
2002 Total			1786	594	178	1063	463	15365	7196	1141	2602	1125	31513	228

Table A3. 2003 May-July VMRC Trips and Turtle Strandings (# of turtles) by Week and Water Body

	Water		Gear Abbreviations											Turtle
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2003	NA	1	15	3	1			24	5			7	55	
		2	16	5	4			31	9			42	107	
		3	10	5	4			17	28			31	95	
		4	18	6	3			8	45			32	112	
		5	16	9	2			9	32			31	99	3
		6	11	10	1			34	3			36	95	8
		7	7	7	1			59	1			32	107	1
		8	4	4	1			64				21	94	8
		9	7	4	1			63				19	94	6
		10	6	2	1			65				17	91	9
		11	2	5	1			65				14	87	1
		12	1	2	1			63				15	82	2
		13	8	9	1			93				24	135	3
	NA Total		121	71	22			595	123			321	1253	41
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2003	NE	1	19			5	15	125	91			10	265	
		2	36			6	27	192	330		8	13	612	
		3	17	1		3	22	191	452		38	11	735	
		4	21			2	9	188	509		39	17	785	
		5	32	3		4	5	147	446		44	14	695	
		6	22	9		8	5	126	387		85	17	659	
		7	19	11		6	6	151	332		114	12	651	
		8	19	10		2	8	188	357		183	2	769	2
		9	13	13		2	8	225	357		197	4	819	17
		10	9	20		4	7	244	329		200	5	818	5
		11	12	22		3	8	281	347		206	6	885	6
		12	23	26		2	6	255	379		225	1	917	1
		13	22	32		4	11	332	521		334	6	1262	
	NE Total		264	147		51	137	2645	4837		1673	118	9872	31
Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2003	NW	1	31			41	13	130	25	7		1	248	
		2	55			57	28	193	63	10		6	412	
		3	40			39	34	190	89	2		4	398	
		4	52			45	26	213	106	3		2	447	1
		5	46			46	28	202	113	1		0	436	1
		6	50	1		46	28	206	82			0	413	1
		7	50			49	32	244	69			3	447	3
		8	46		2	47	24	261	64			8	452	13
		9	43		2	44	18	301	56			9	473	
		10	31	3		46	11	328	48			10	477	3
		11	20		1	48	12	308	43	1		7	440	
		12	39		1	37	13	284	45	4		5	428	
		13	40		2	35	16	383	62	3		15	556	
	NW Total		543	4	8	580	283	3243	865	31		70	5627	22

Table A3 (cont.). 2003 May-July VMRC Trips and Turtle Strandings (# of turtles) by Week and Water Body

Year	Body	Week	AGN	DGN	HS	PN	PNC	POT	PPOT	PT	SCR	Other	Total	Strandings
2003	SA	1	28									2	30	
		2	44	2					1			5	52	
		3	26						6			2	34	
		4	32	1					7			4	44	4
		5	30	3					5			2	40	4
		6	22	2				4				0	28	6
		7	29									4	33	4
		8	32									7	39	28
		9	30									5	35	10
		10	10									3	13	4
		11	6	1								4	11	
		12										3	3	2
		13										7	7	3
	SA Total		289	9				4	19			48	369	65
Year	**Body**	**Week**	**AGN**	**DGN**	**HS**	**PN**	**PNC**	**POT**	**PPOT**	**PT**	**SCR**	**Other**	**Total**	**Strandings**
2003	SE	1	30	6		16	14	149	69	32		11	327	
		2	47	10		18	20	215	131	53		22	516	
		3	29	5		20	10	203	109	43		17	436	
		4	25	7		22	3	212	78	44		19	410	2
		5	27	8	1	20		216	58	54		19	403	12
		6	32	7	3	21		166	79	62		14	384	16
		7	31	9	6	21	3	167	77	57	1	22	394	27
		8	38	15	1	18	3	166	93	50	1	17	402	34
		9	20	18		20	3	168	73	56	2	27	387	25
		10	9	10		14	5	196	75	35	1	21	366	7
		11	4	9		25	10	197	83	35	5	18	386	2
		12	18	9		23	11	204	78	54	5	29	431	3
		13	21	17		18	8	285	106	65	5	35	560	3
	SE Total		331	130	11	256	90	2544	1109	640	20	271	5402	131
Year	**Body**	**Week**	**AGN**	**DGN**	**HS**	**PN**	**PNC**	**POT**	**PPOT**	**PT**	**SCR**	**Other**	**Total**	**Strandings**
2003	SW	1	40		6	3	6	197	45	28		8	333	
		2	66		5	4	16	308	96	35		16	546	
		3	44		7	3	14	285	159	37	3	8	560	1
		4	45	1	9	7	9	269	125	40	1	18	524	3
		5	60	1	12	3	6	229	48	47		18	424	4
		6	55		11	10	10	251	20	40		20	417	8
		7	59		11	10	9	265	21	50		21	446	11
		8	47		7	12	10	283	21	42		24	446	42
		9	45		5	13	8	290	19	43	1	24	448	20
		10	32	2	9	8	6	287	23	40		19	426	6
		11	35	5	11	10	8	297	26	36	2	23	453	2
		12	50	3	13	10	7	282	25	37		37	464	3
		13	55	11	16	10	8	428	38	71		35	672	
	SW Total		633	23	122	103	117	3671	666	546	7	271	6159	100

Table A4. 2001 May-July VTR Trips and Turtle Strandings (# of turtles) by Week and Water Body

			Gear Abbreviations													Turtle Strandings by Water Body			
Year	Statistical Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2001	625	1		49	7					8			4		68				
		2		64	10					15			6		95				
		3		55	14	2				5			11		87			1	
		4		17	11					5			8		41		1	4	5
		5		13	16					7			8	1	45	16	1	15	13
		6		12	18					10			5	4	49	12	3	59	13
		7		5	16	2							3	2	28	13	1	25	13
		8		1	20								3		24	13	4	2	6
		9			14									1	15	3	6	1	7
		10		5	10	1				17				2	35	4	2	1	
		11		4	18					16				4	42	1	3		3
		12		7	7					5				3	22	1	1		5
		13		7	12									2	21	1	4	4	9
	625 Total			239	173	5				88			48	19	572	64	26	112	74
Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2001	626	1	2	3	5					7	2				19				
		2	1	3	4	1				10	1				20				
		3	5		6	2				2	1				16			1	
		4	1	2	1	7				1	1				13		1	4	5
		5	1	7	4	7				5	1			1	26	16	1	15	13
		6	2	2	5	6				2	4		1		22	12	3	59	13
		7	1	1	4	9	2				4			1	22	13	1	25	13
		8	6		5	5	2				3				21	13	4	2	6
		9	1		8	2	2				3				16	3	6	1	7
		10	8		14	5	6			8	4				45	4	2	1	
		11	6		18	1	8			3	5				41	1	3		3
		12	7		15	1	4				4				31	1	1		5
		13	21		5	5	3		1		5				40	1	4	4	9
	626 Total		62	18	94	51	27		1	38	38		1	2	332	64	26	112	74

Table A4 (cont.). 2001 May-July VTR Trips and Turtle Strandings (# of turtles) by Week and Water Body

Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2001	631	1		3	14					5			1		23				
		2		5	13					6					24				
		3		4	12					5			1		22			1	
		4		3	9					7			1		20		1	4	5
		5		4	13					3			1		21	16	1	15	13
		6			19					6					25	12	3	59	13
		7			10										10	13	1	25	13
		8			18										18	13	4	2	6
		9			9										9	3	6	1	7
		10			23				1	19				3	46	4	2	1	
		11		1	21					10				1	33	1	3		3
		12			26					8				2	36	1	1		5
		13		2	17									1	20	1	4	4	9
	631 Total			22	204				1	69			4	7	307	64	26	112	74
Year	**Area**	**Week**	**DRS**	**GNS**	**HND**	**OTC**	**OTF**	**OTM**	**PTC**	**PTF**	**PTL**	**PTM**	**PTW**	**Other**	**Total**	**NA**	**SA**	**SE**	**SW**
2001	632	1																	
		2			2					2					4				
		3	1												1			1	
		4			4										4		1	4	5
		5			1					2					3	16	1	15	13
		6			3										3	12	3	59	13
		7			3										3	13	1	25	13
		8			2		3								5	13	4	2	6
		9			1										1	3	6	1	7
		10	1				1								2	4	2	1	
		11					1								1	1	3		3
		12			3		1								4	1	1		5
		13			1										1	1	4	4	9
	632 Total		2		20		6			4					32	64	26	112	74
2001 Total			64	279	491	56	33		2	199	38		53	28	1243				

Table A5. 2002 May-July VTR Trips and Turtle Strandings (# of turtles) by Week and Water Body

	Statistical		Gear Abbreviations												Turtle Strandings by Water Body			
Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2002	625	1		13	4					10			2	1	30	1	1	3	2
		2		20	7					13			5		45	1	10	3	3
		3		5	3					7			4		19	4		5	1
		4		9	10	1				13			7		40	3	7	6	11
		5		3	8					6			6		23	10	5	12	14
		6			4					5			2		11	17		6	3
		7		2	5								3		10	6	2	7	5
		8	1	7	5								2		15	9	8	1	3
		9		1	5										6	8		1	2
		10		1	13					6				1	21	2		1	
		11		2	9					5					16	3	7	1	2
		12		2	5				4	3				2	16	6	3		
		13		4	3				4	2				1	14	3	2	1	1
	625 Total		1	69	81	1			8	70			31	5	266	73	45	47	47
Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2002	626	1	3	3		5				3	1				15	1	1	3	2
		2	8		1	9				6	3			1	28	1	10	3	3
		3	18	3	2	8				4	1				36	4		5	1
		4	11	8	4	17				7	5				52	3	7	6	11
		5	13	10	2	9				1				1	36	10	5	12	14
		6	7	2	3	12	1			2	3				30	17		6	3
		7	5		9	14	1		1		4				34	6	2	7	5
		8	4		12	17	3				4				40	9	8	1	3
		9	7		14	12	3		1		4				41	8		1	2
		10	3		24	8	1		1	4	4				45	2		1	
		11	5		16	3	2			4	5				35	3	7	1	2
		12			26	3	3		1	4	3				40	6	3		
		13	3		25	5				3	8				44	3	2	1	1
	626 Total		87	26	138	122	14		4	38	45			2	476	73	45	47	47

Table A5 (cont.). 2002 May-July VTR Trips and Turtle Strandings (# of turtles) by Week and Water Body

Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2002	631	1		2	2	2				2			1		9	1	1	3	2
		2	1	5	6					10			2		24	1	10	3	3
		3	1	2	6					4			2		15	4		5	1
		4	1	2	7		1			8			2		21	3	7	6	11
		5			9					3			2		14	10	5	12	14
		6			9					3				1	13	17		6	3
		7		1	4										5	6	2	7	5
		8			8										8	9	8	1	3
		9			6		1			1					8	8		1	2
		10			16					7					23	2		1	
		11			12					4					16	3	7	1	2
		12			15				3	3				2	23	6	3		
		13			31				6	5					42	3	2	1	1
	631 Total		3	12	131	2	2		9	50			9	3	221	73	45	47	47
Year	**Area**	**Week**	**DRS**	**GNS**	**HND**	**OTC**	**OTF**	**OTM**	**PTC**	**PTF**	**PTL**	**PTM**	**PTW**	**Other**	**Total**	**NA**	**SA**	**SE**	**SW**
2002	632	1			2										2	1	1	3	2
		2			6					1					7	1	10	3	3
		3	1		1					1					3	4		5	1
		4			3					2					5	3	7	6	11
		5			3					1					4	10	5	12	14
		6	1		3										4	17		6	3
		7			8	1									9	6	2	7	5
		8			11						1				12	9	8	1	3
		9			8									1	9	8		1	2
		10			10									1	11	2		1	
		11			6		1								7	3	7	1	2
		12			6		1			1					8	6	3		
		13			12		1								13	3	2	1	1
	632 Total		2		79	1	3			6	1			2	94	73	45	47	47
2002 Total			93	107	429	126	19		21	164	46		40	12	1057				

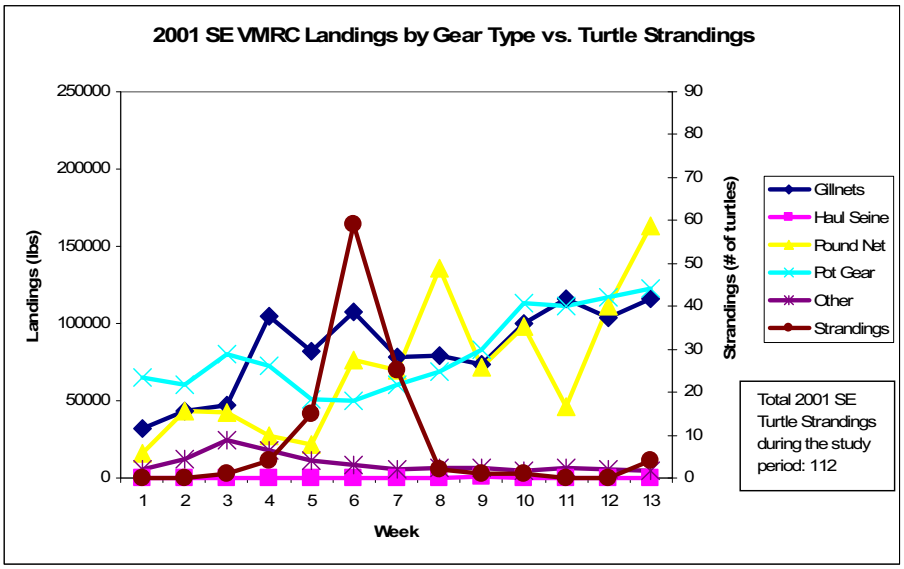
Table A6. 2003 May-July VTR Trips and Turtle Strandings (# of turtles) by Week and Water Body

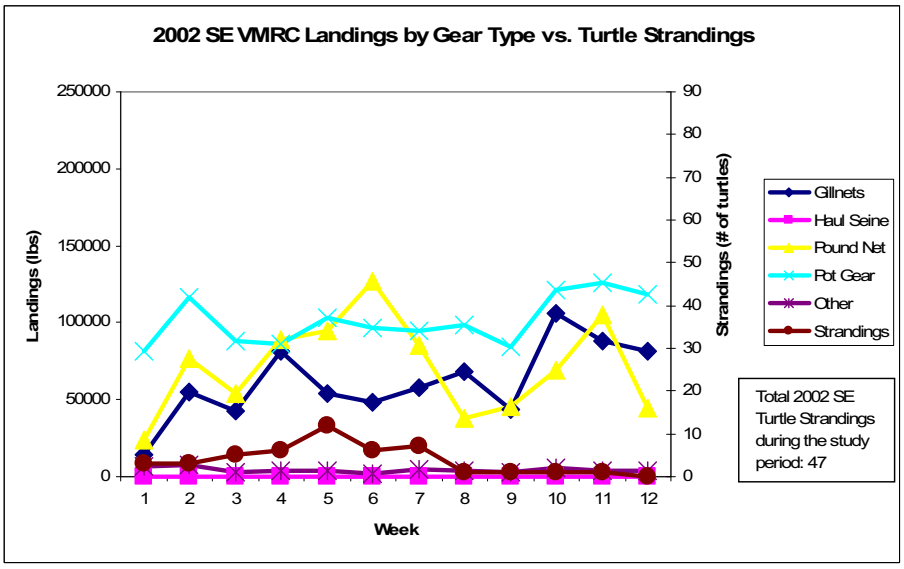
	Statistical		Gear Abbreviations												Turtle Strandings by Water Body			
Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2003	625	1		24	7	2				4					37				
		2		38	14	1				6					59				
		3		21	8					3	1		1		34				1
		4		33	5					9					47		4	2	3
		5		32	16		1			3			3		55	3	4	12	4
		6		5	13		1			5			4		28	8	6	16	8
		7		2	10	2	2			2			4		22	1	4	27	11
		8		5	16					6			2		29	8	28	34	42
		9		8	19	3				9	1				40	6	10	25	20
		10			7	1				2				1	11	9	4	7	6
		11		1	15	1				4			1	1	23	1		2	2
		12			6	1				1					8	2	2	3	3
		13			11					5					16	3	3	3	
	625 Total			169	147	11	4			59	2		15	2	409	41	65	131	100
Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2003	626	1	3	8	3	5	2			3	4				28				
		2	6	14	5	1	3			3	3				35				
		3	10	16	2	1	2			4	1				36				1
		4	3	16	2	4	2				4				31		4	2	3
		5	7	22	1	2	5			2	1				40	3	4	12	4
		6	5	19	7	1	3			1	2				38	8	6	16	8
		7	8	10	5	4	7			1	3	2	1		41	1	4	27	11
		8	11	1	2	4	7			3	1		3		32	8	28	34	42
		9	16		11	14	10		1	6	2		4		64	6	10	25	20
		10	16		9	16	6				3		2		52	9	4	7	6
		11	7		11	16	9			2	4		1	1	51	1		2	2
		12	12		8	19	13			1	3				56	2	2	3	3
		13	24		12	23	31		1	1	5				97	3	3	3	
	626 Total		128	106	78	110	100		2	27	36	2	11	1	601	41	65	131	100

Table A6 (cont.). 2003 May-July VTR Trips and Turtle Strandings (# of turtles) by Week and Water Body

Year	Area	Week	DRS	GNS	HND	OTC	OTF	OTM	PTC	PTF	PTL	PTM	PTW	Other	Total	NA	SA	SE	SW
2003	631	1		5	7					2					14				
		2			13	3				1				1	18				
		3			9	1				1				1	12				1
		4			17	1	1			1					20		4	2	3
		5		1	13	4								1	19	3	4	12	4
		6			10	4				1				1	16	8	6	16	8
		7			14	2									16	1	4	27	11
		8		1	10	1	1			2					15	8	28	34	42
		9			13	1	3			5					22	6	10	25	20
		10			4					1				1	6	9	4	7	6
		11			15					1				1	17	1		2	2
		12			18					3				2	23	2	2	3	3
		13			15					5					20	3	3	3	
	631 Total			7	158	17	5			23				8	218	41	65	131	100
Year	**Area**	**Week**	**DRS**	**GNS**	**HND**	**OTC**	**OTF**	**OTM**	**PTC**	**PTF**	**PTL**	**PTM**	**PTW**	**Other**	**Total**	**NA**	**SA**	**SE**	**SW**
2003	632	1								1					1				
		2								2					2				
		3								1					1				1
		4								1					1		4	2	3
		5			1					1					2	3	4	12	4
		6					1			1					2	8	6	16	8
		7			3		5			1					9	1	4	27	11
		8			4										4	8	28	34	42
		9			6			1		1					8	6	10	25	20
		10			4		1								5	9	4	7	6
		11			5		3	1		1					10	1		2	2
		12			13		1		1	1					16	2	2	3	3
		13			10		4								14	3	3	3	
	632 Total				46		15	2	1	11					75	41	65	131	100
2003 Total			128	282	429	138	124	2	3	120	38	2	26	11	1303				

Figure A1. Southeast Region 2001-2003 VMRC landings by gear type and turtle strandings.





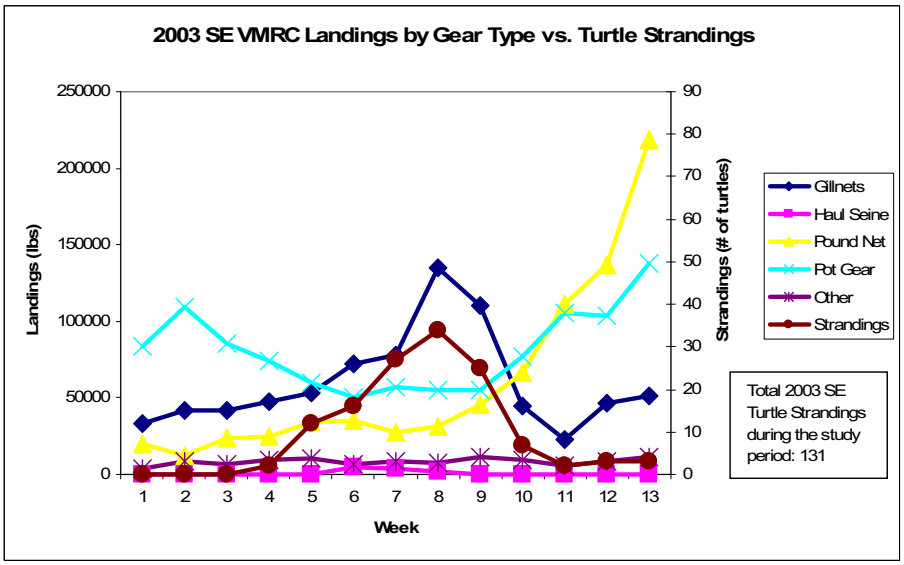
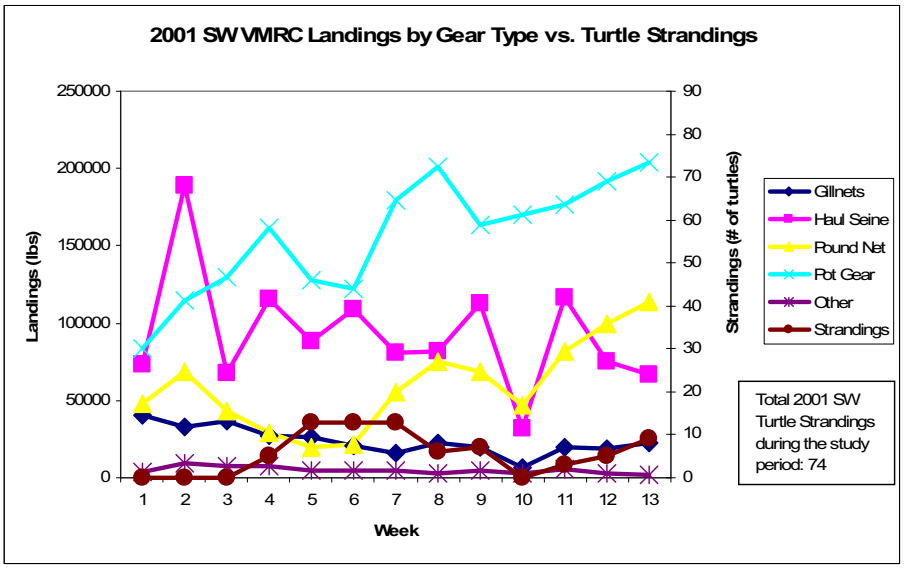
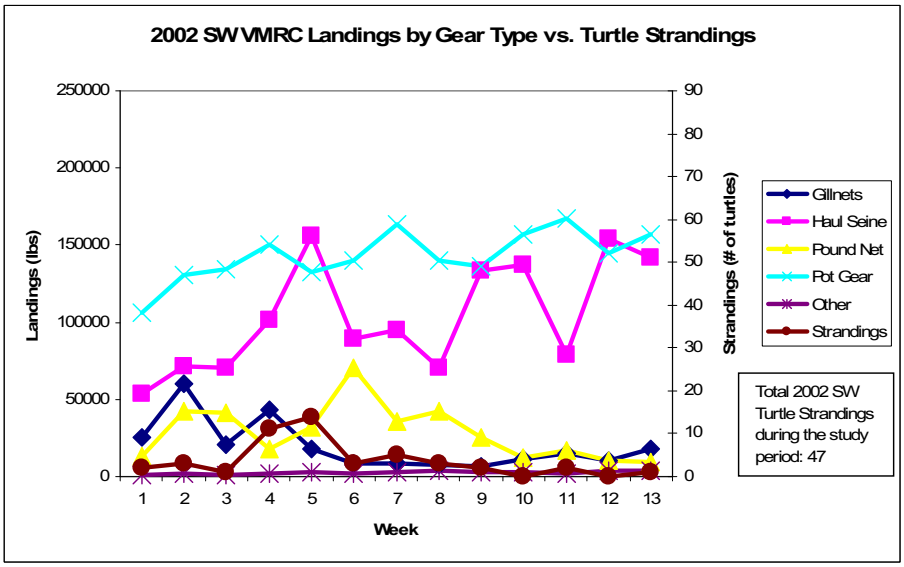


Figure A2. Southwest Region 2001-2003 VMRC landings by gear type and turtle strandings.





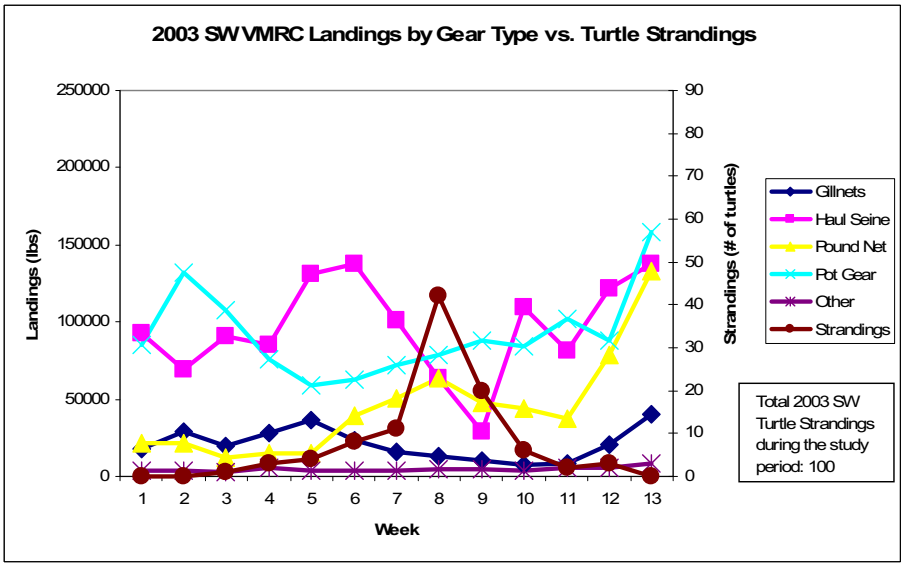
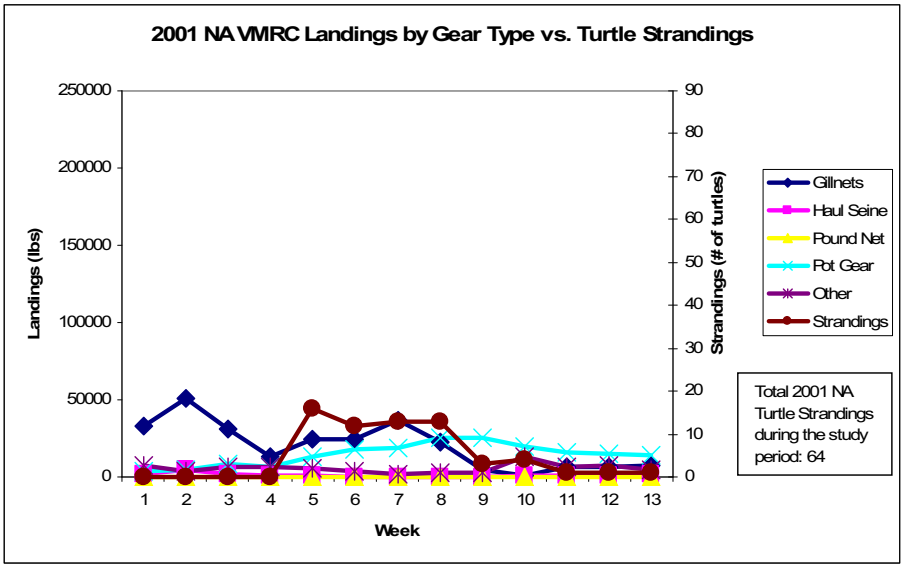
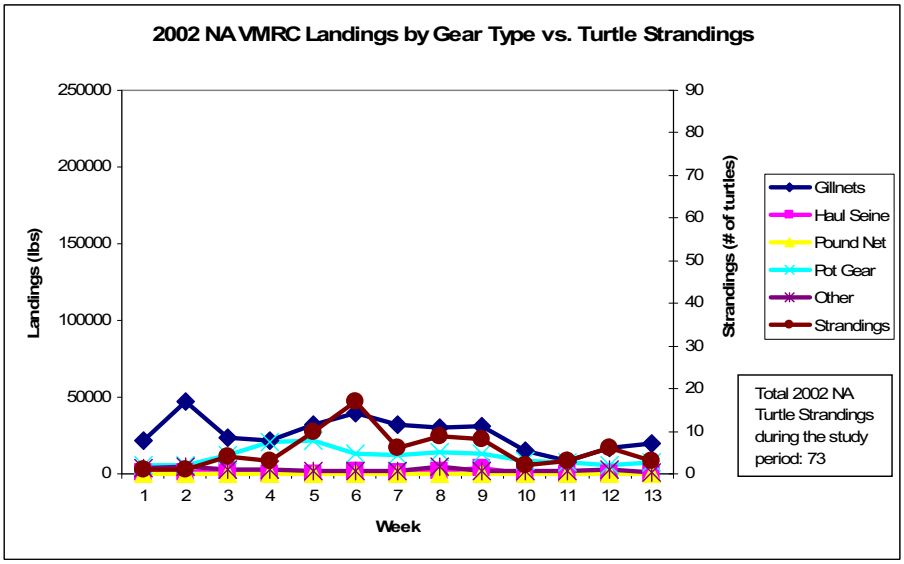


Figure A3. North Atlantic Region 2001-2003 VMRC landings by gear type and turtle strandings.





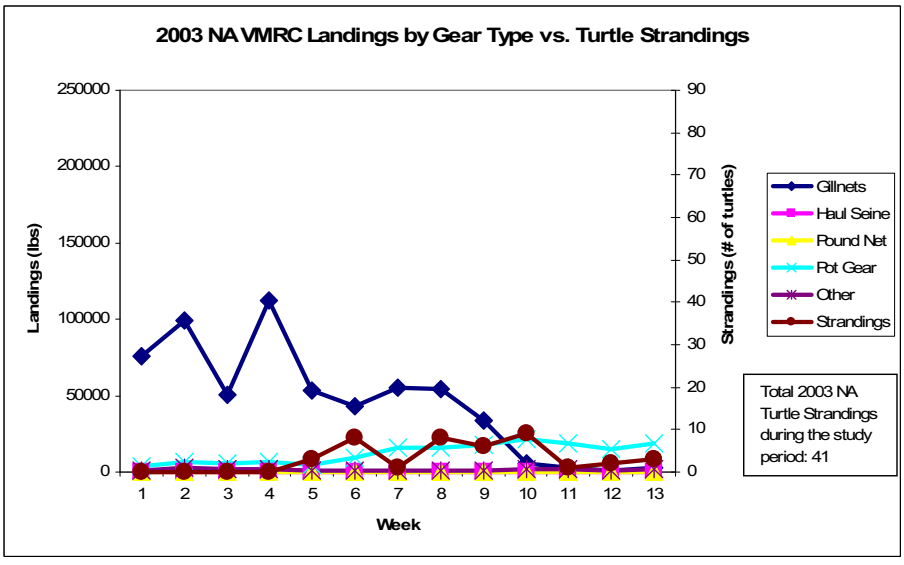
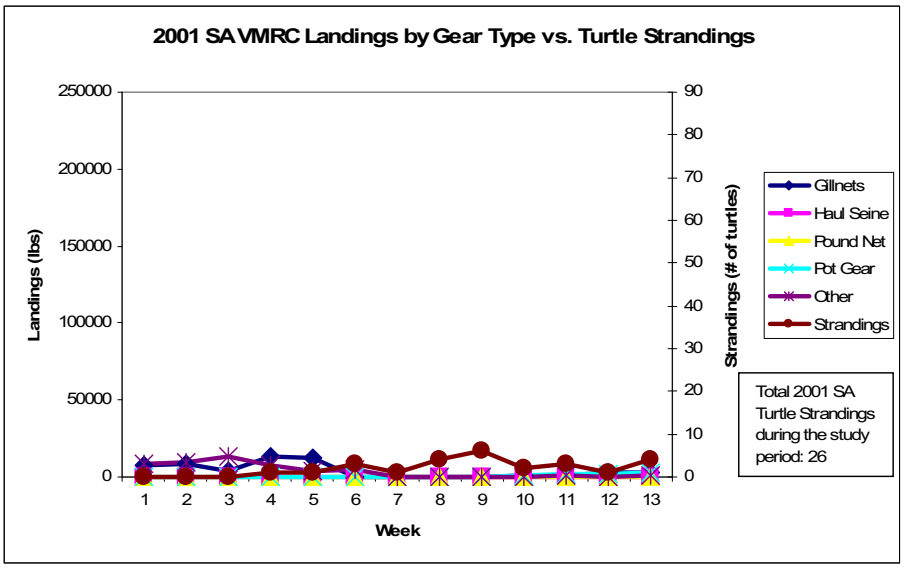
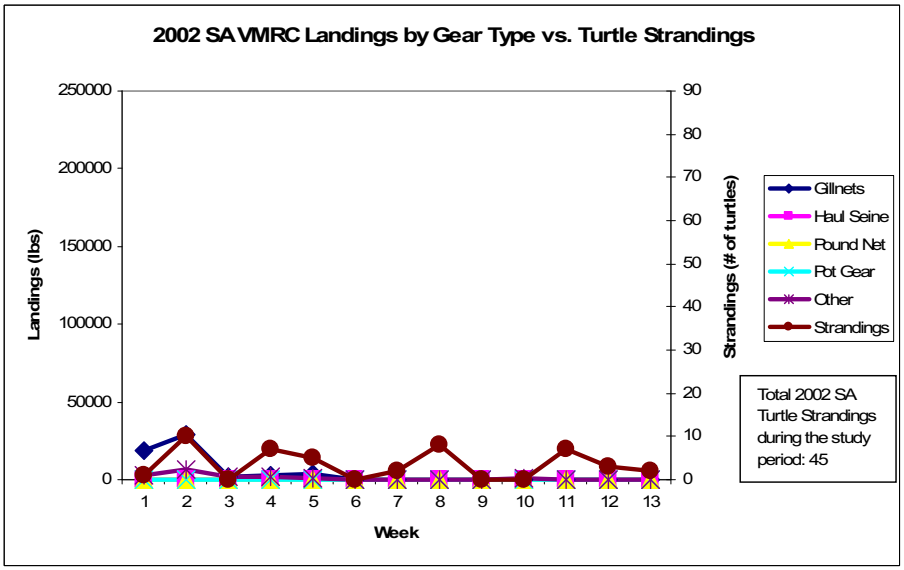


Figure A4. South Atlantic Region 2001-2003 VMRC landings by gear type and turtle strandings.





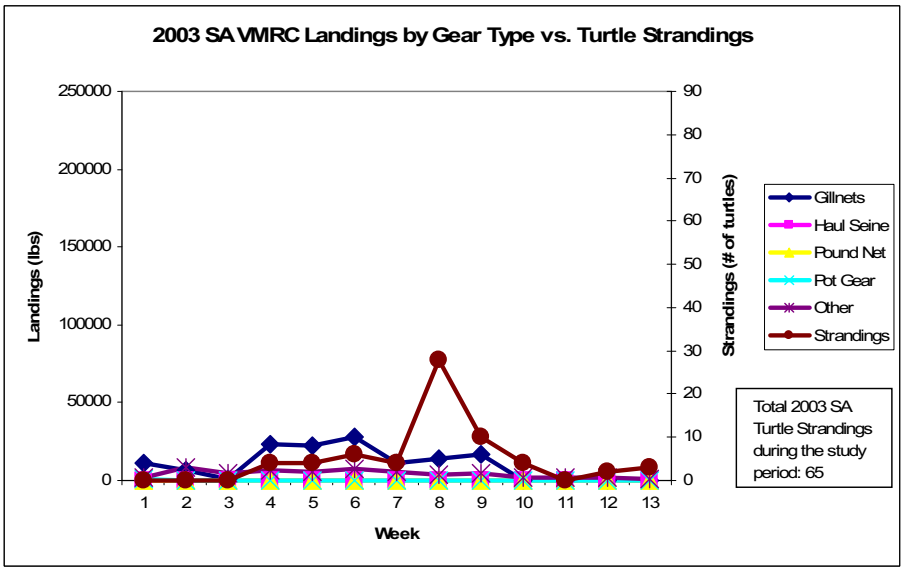
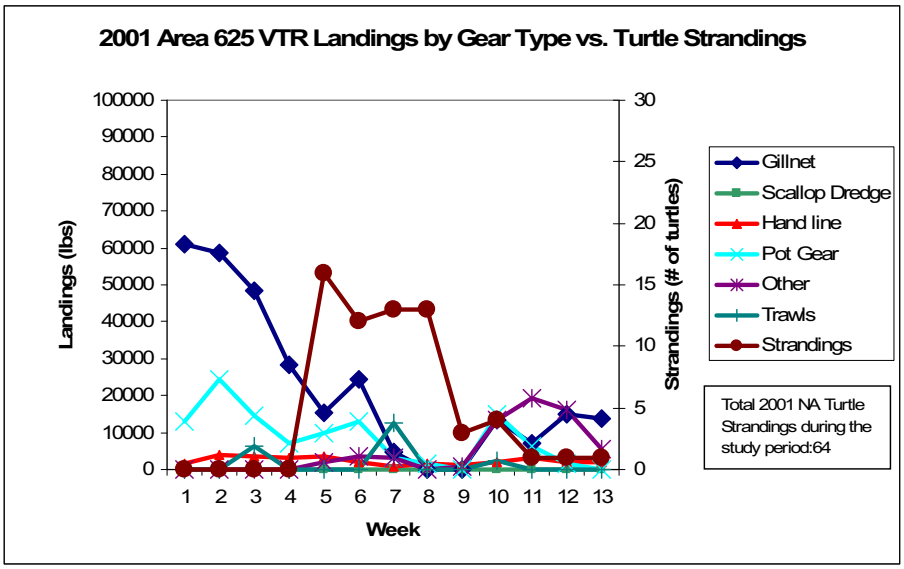
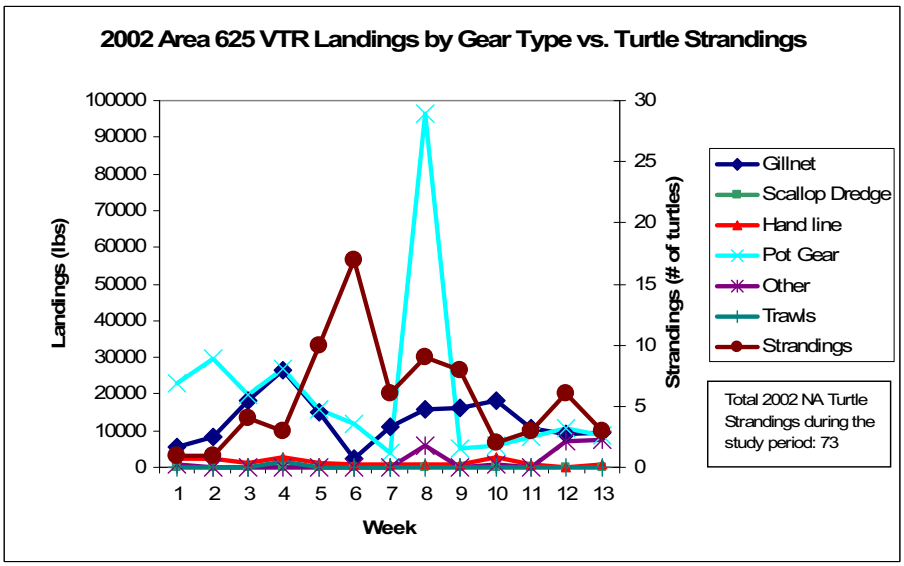


Figure A5. Statistical Area 625 2001-2003 VTR landings by gear type and turtle strandings. (Note axes are on a different scale than VMRC data.)





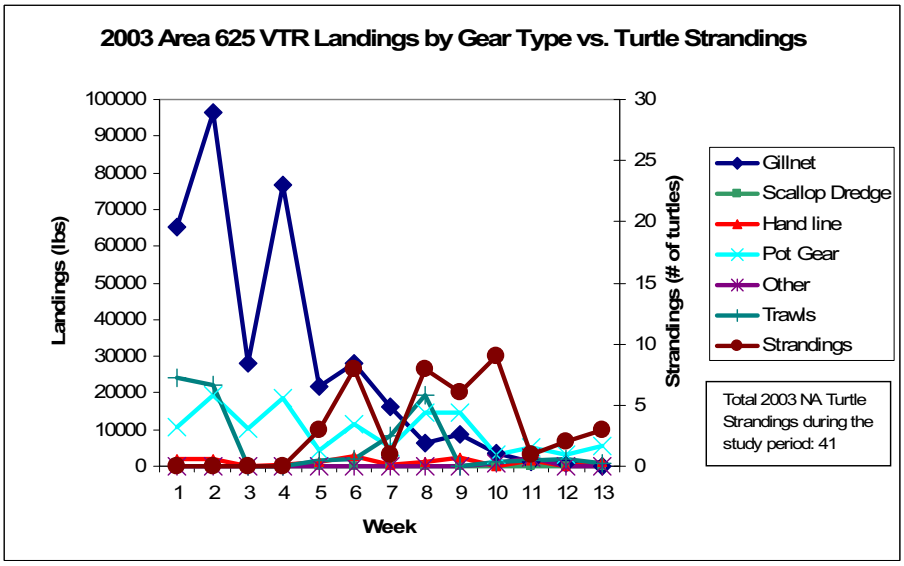
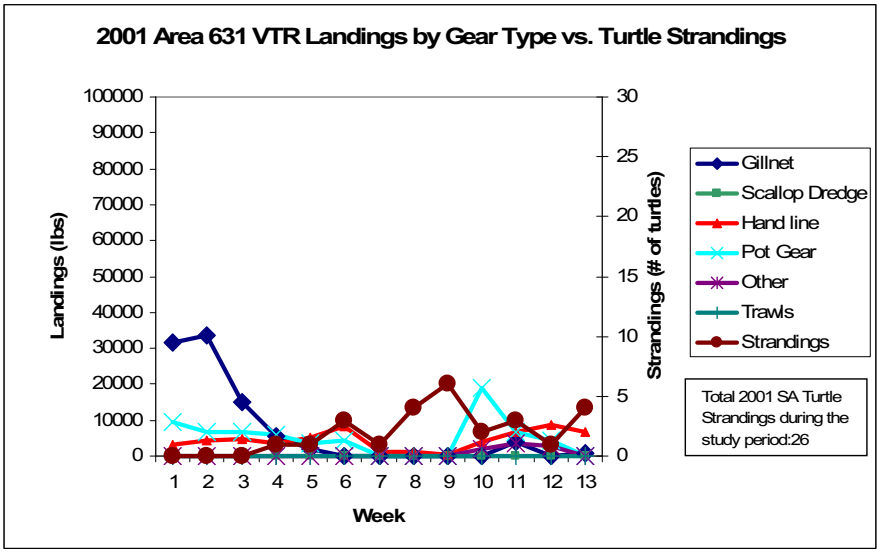
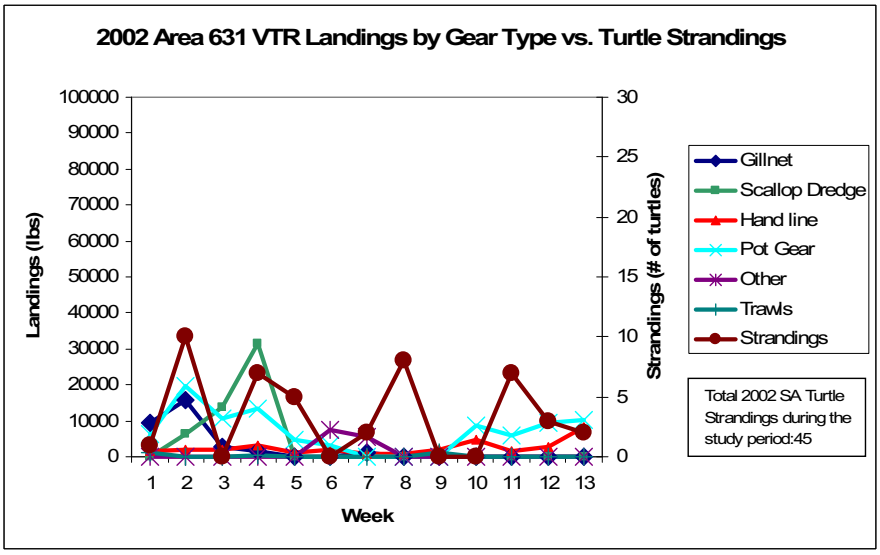


Figure A6. Statistical Area 631 2001-2003 VTR landings by gear type and turtle strandings. (Note axes are on a different scale than VMRC data.)





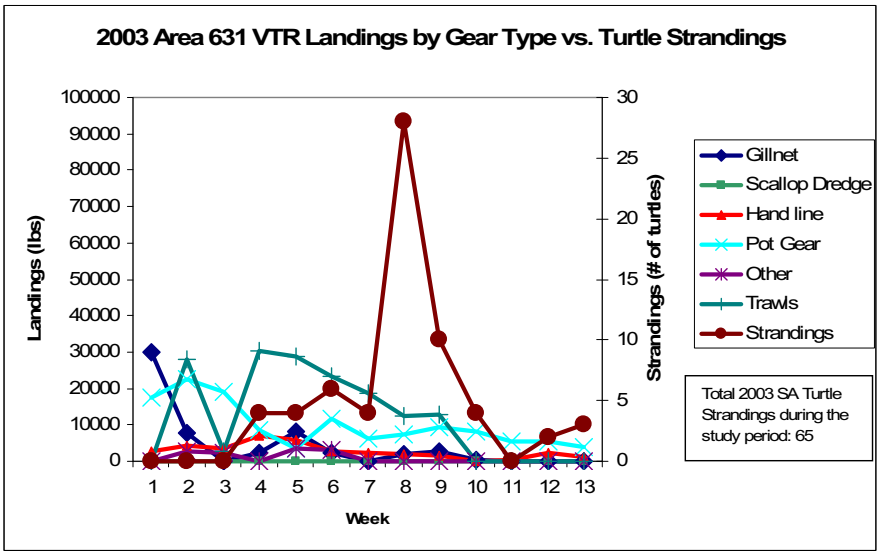
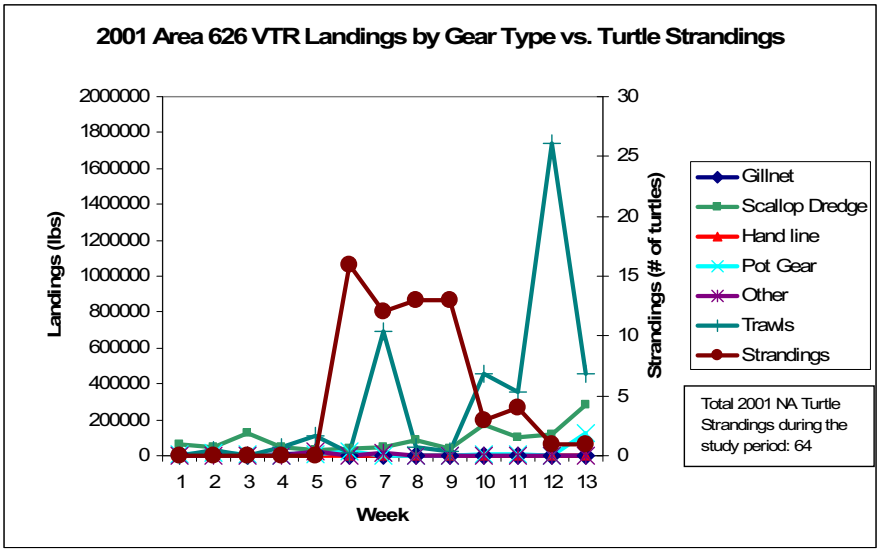
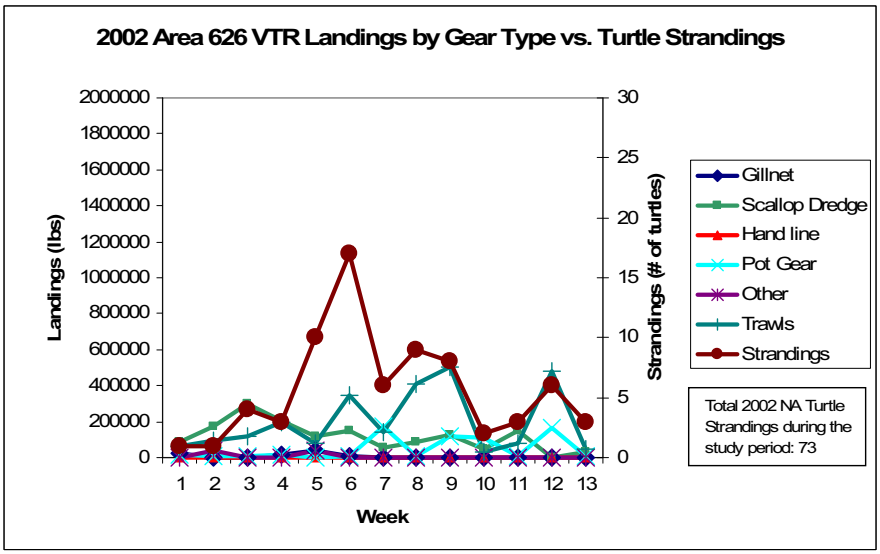


Figure A7. Statistical Area 626 2001-2003 VTR landings by gear type and turtle strandings. (Note axes are on a different scale than both previous VTR and VMRC figures.)





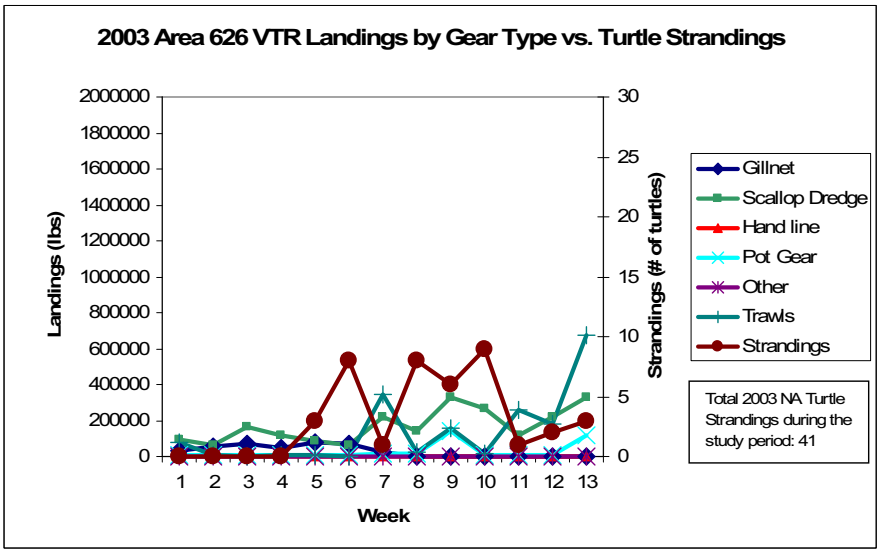
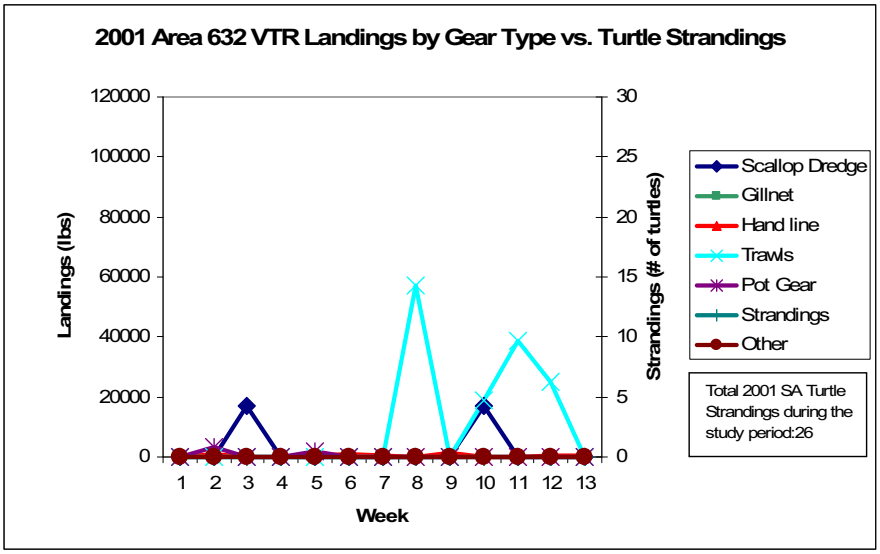
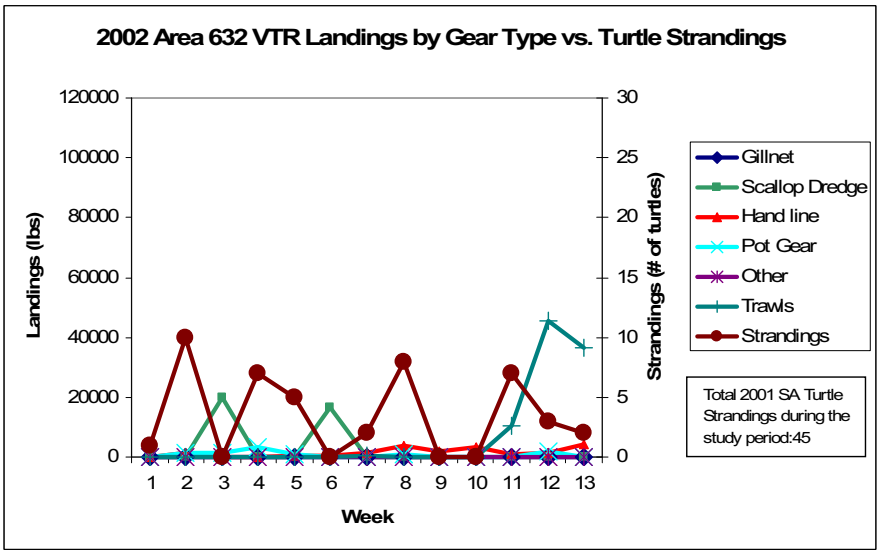


Figure A8. Statistical Area 632 2001-2003 VTR Landings by gear type and turtle strandings. (Note 2003 figure has a different scale for landings than 2001 and 2002 figures.)





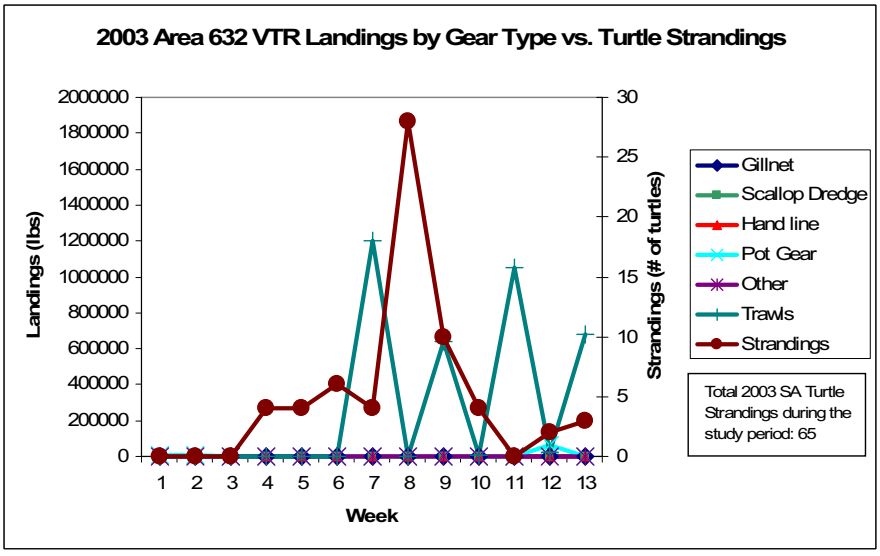
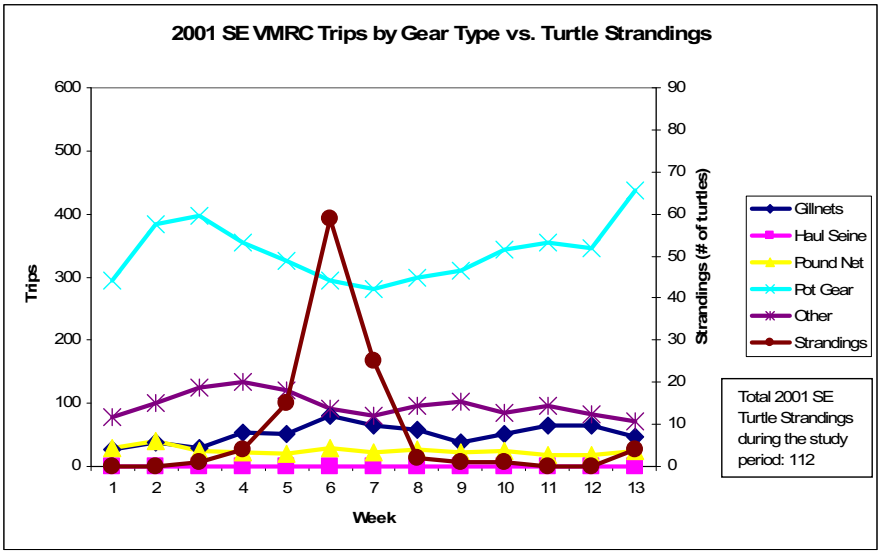
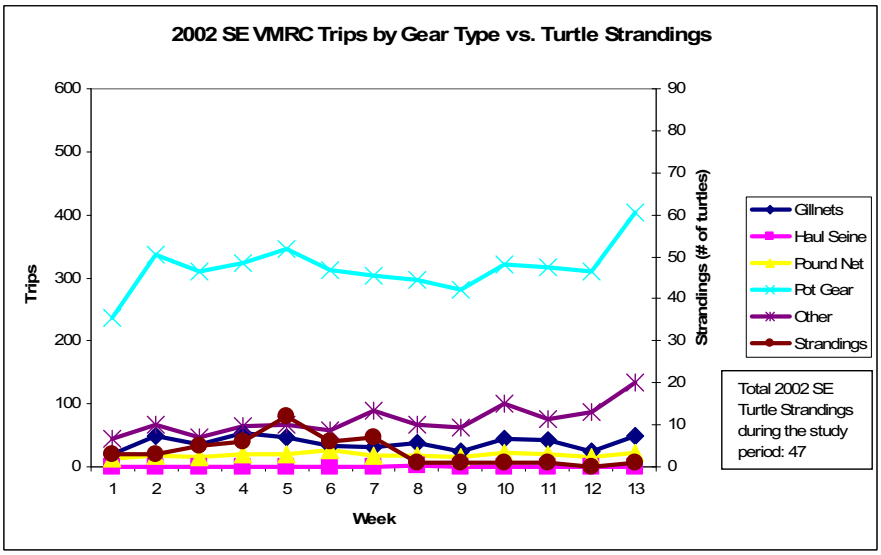


Figure A9. Southeast Region 2001-2003 VMRC trips by gear type and turtle strandings





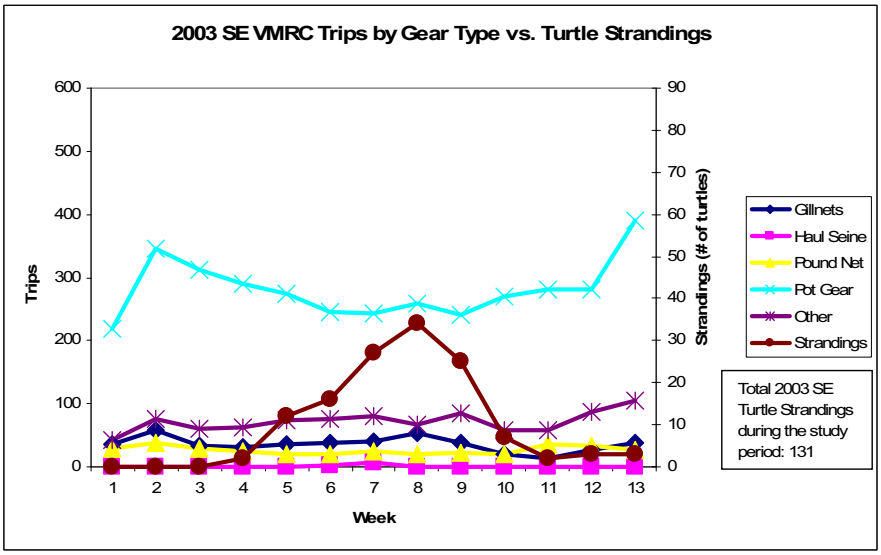
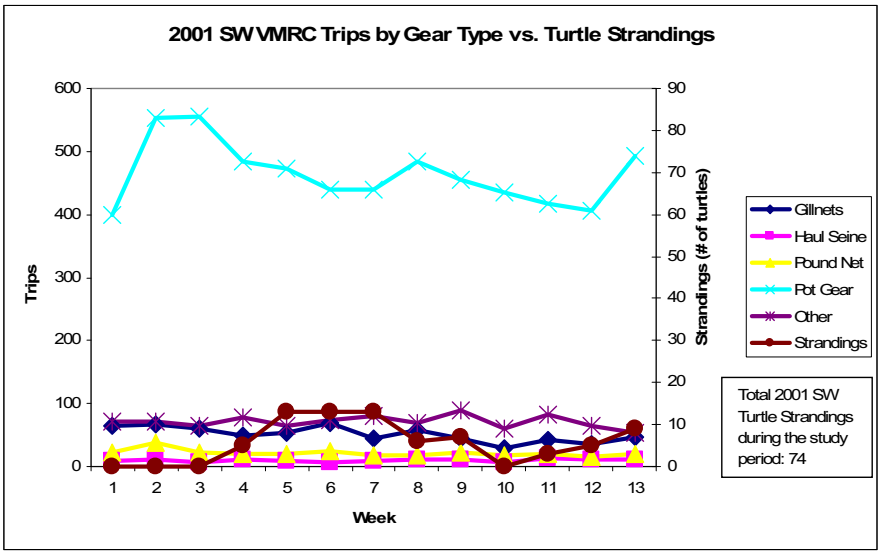
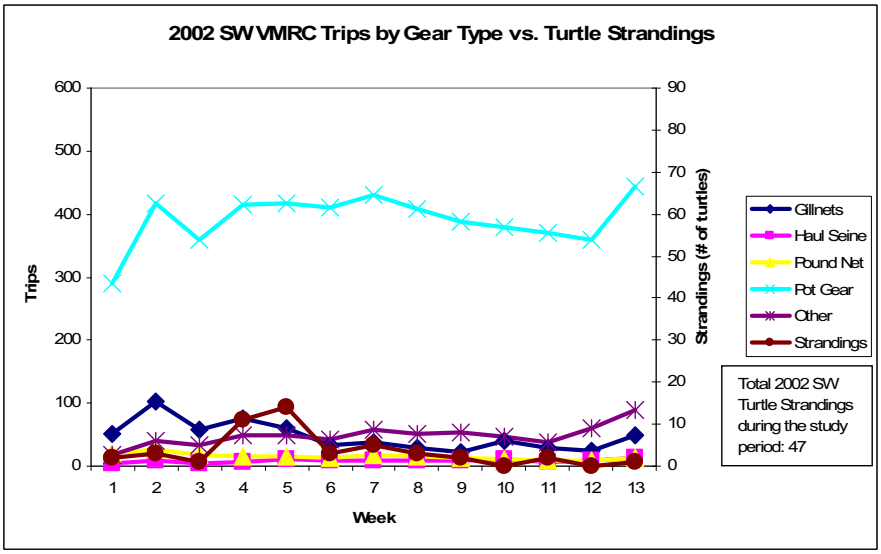


Figure A10. Southwest Region 2001-2003 VMRC trips by gear type and turtle strandings





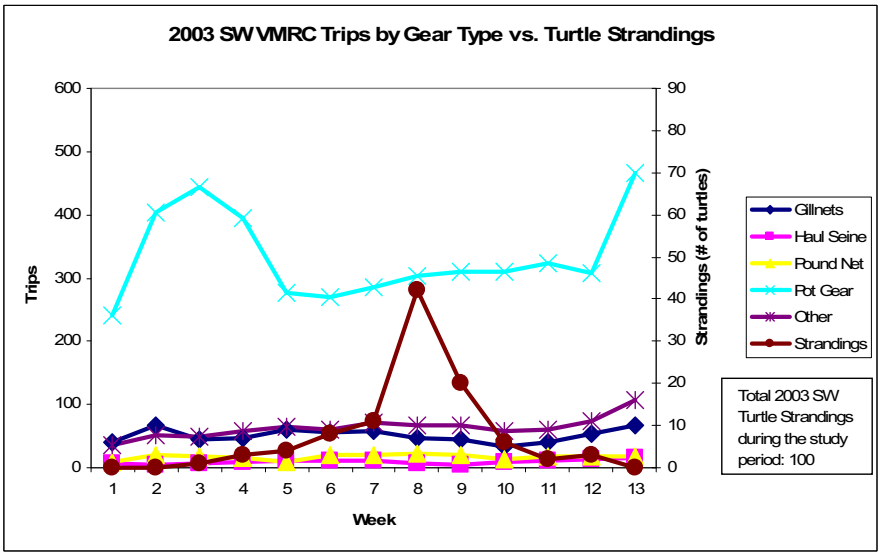
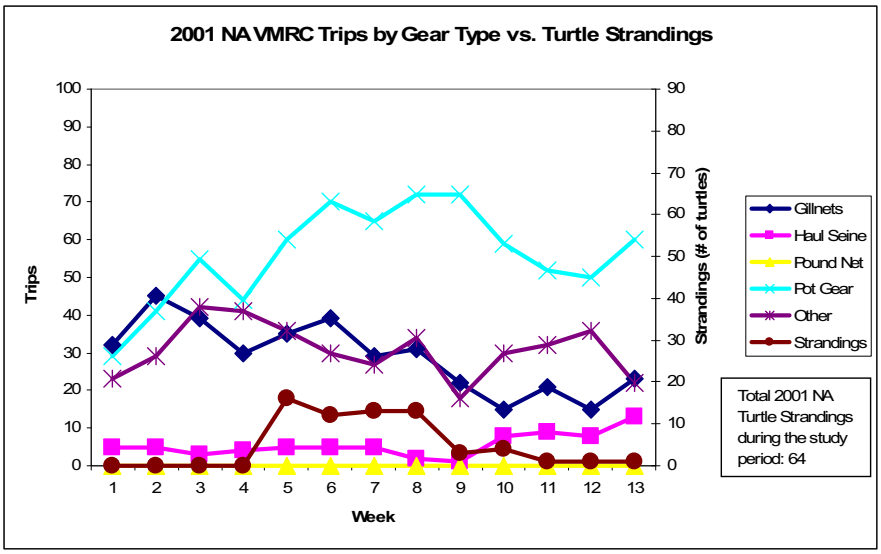
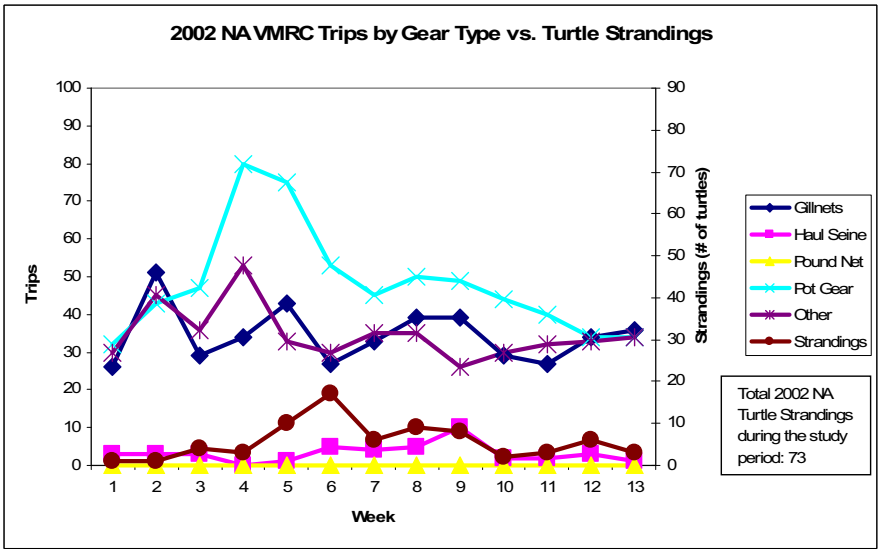


Figure A11. North Atlantic Region 2001-2003 VMRC trips by gear type and turtle strandings. (Note trip axes are on a different scale than both SE and SW VMRC figures.)





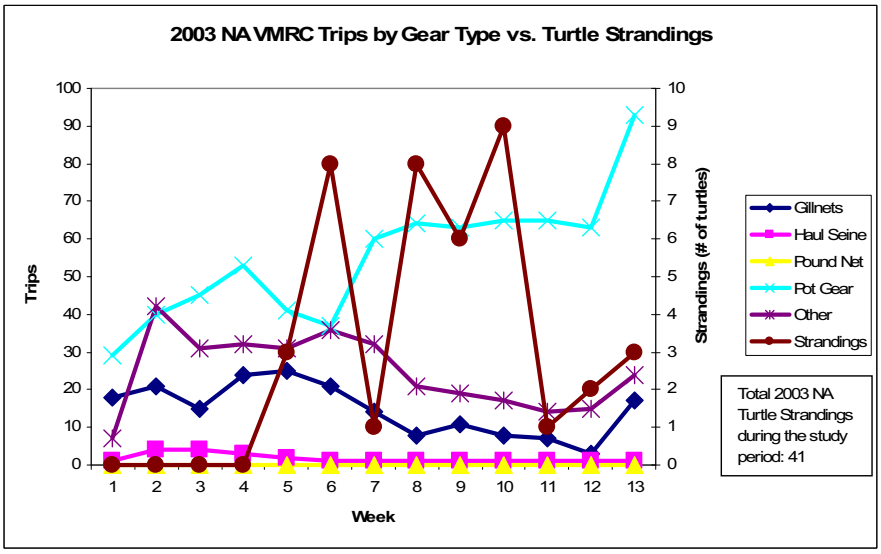
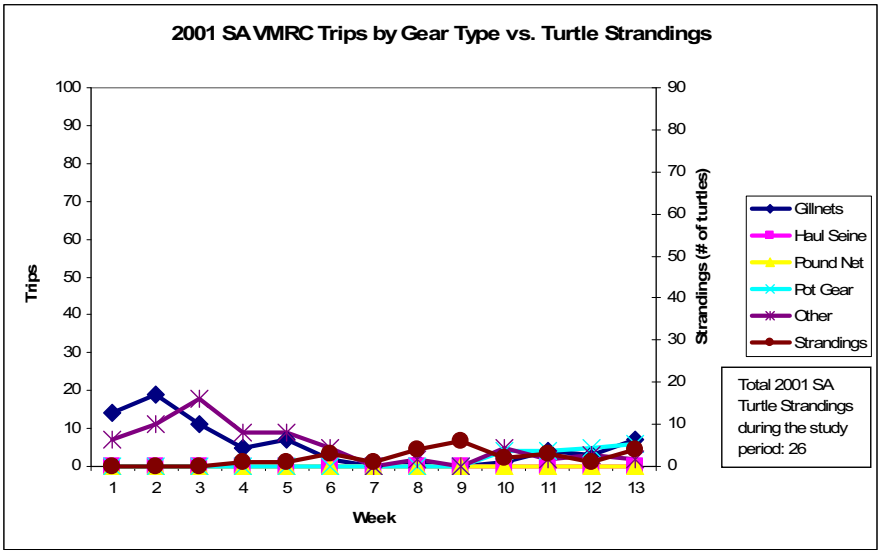
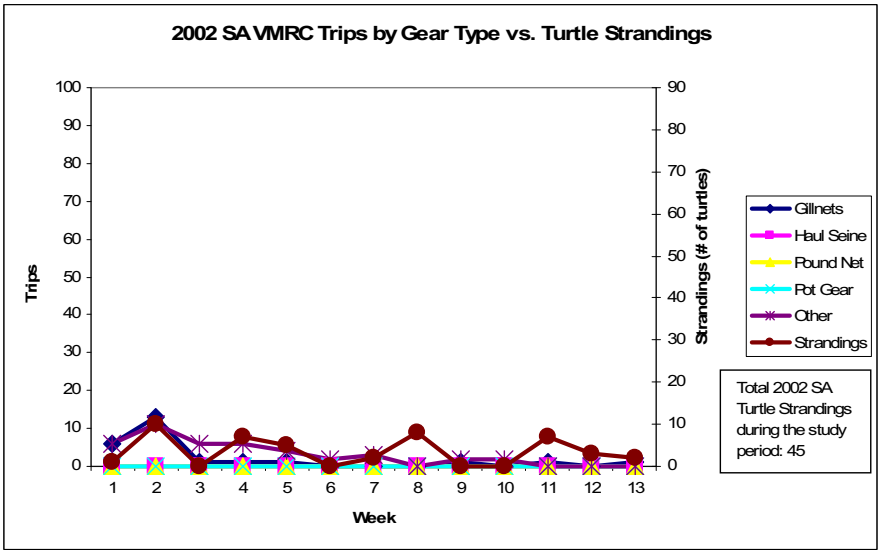


Figure A12. South Atlantic Region 2001-2003 VMRC trips by gear type and turtle strandings. (Note trip axes are on a different scale than both SE and SW VMRC figures.)





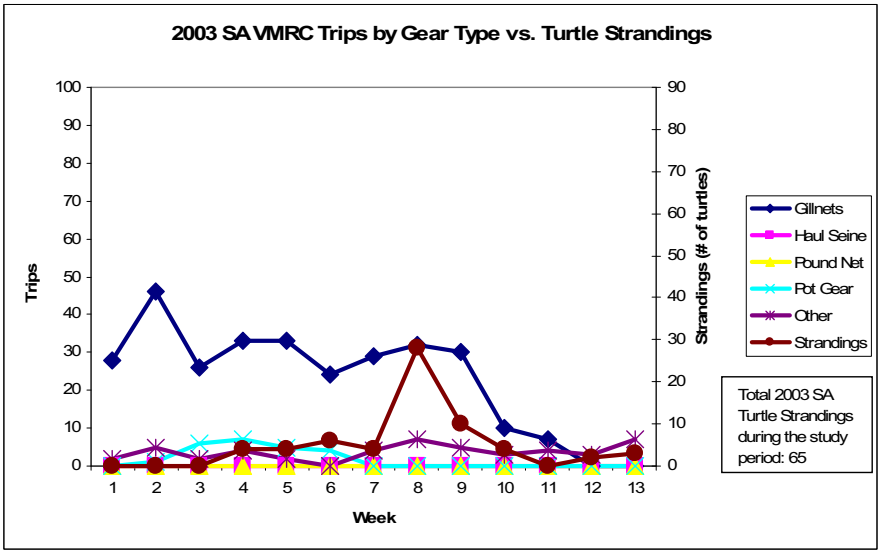
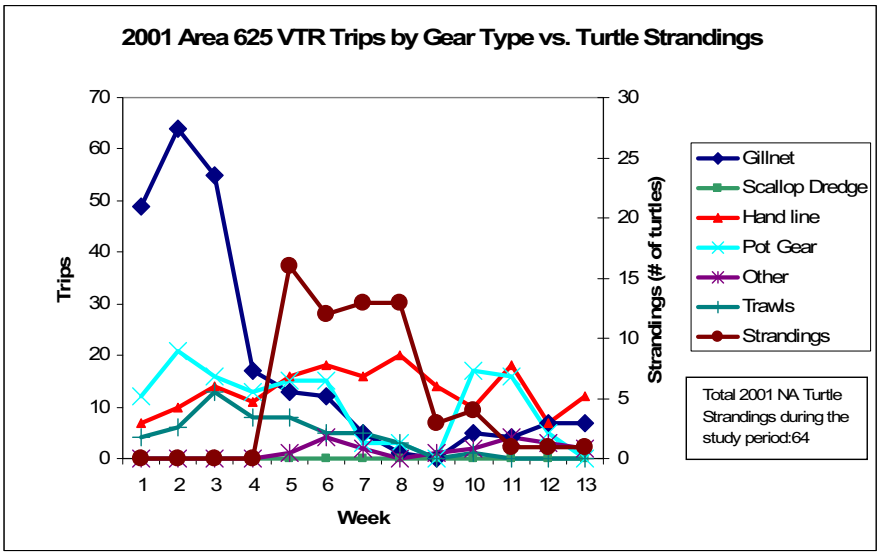
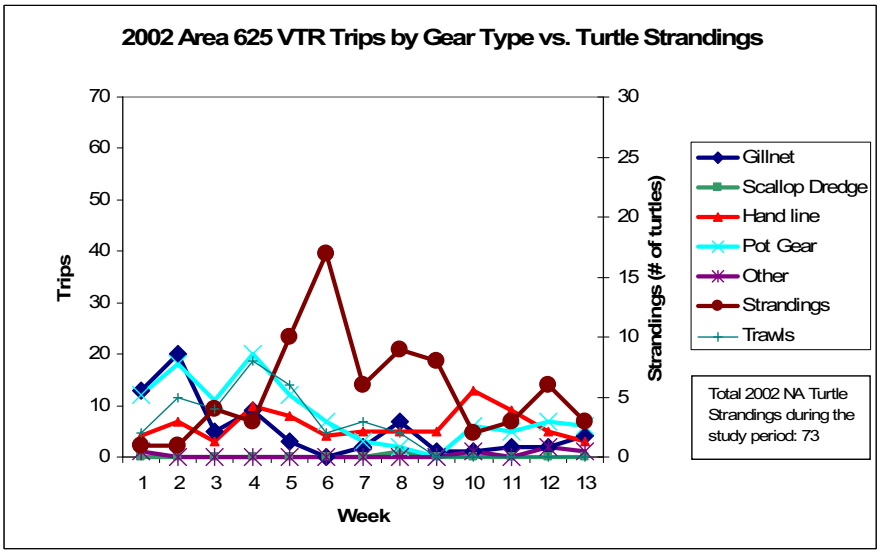


Figure A13. Statistical Area 625 2001-2003 VTR trips by gear type and turtle strandings. (Note trip and strandings axes are on a different scale than VMRC figures.)





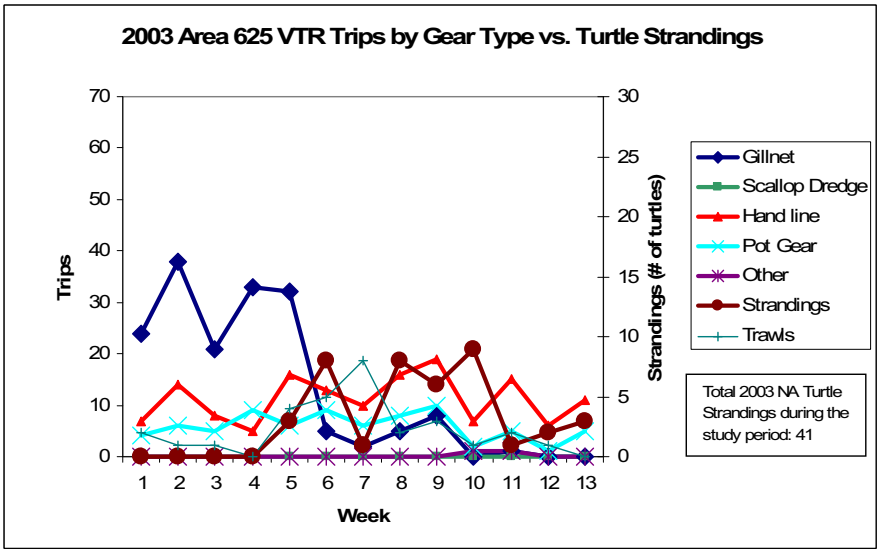
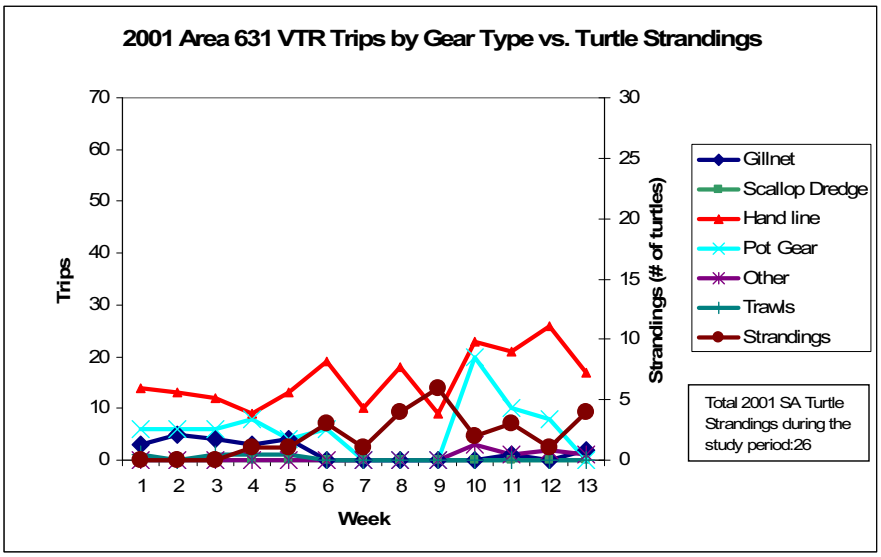
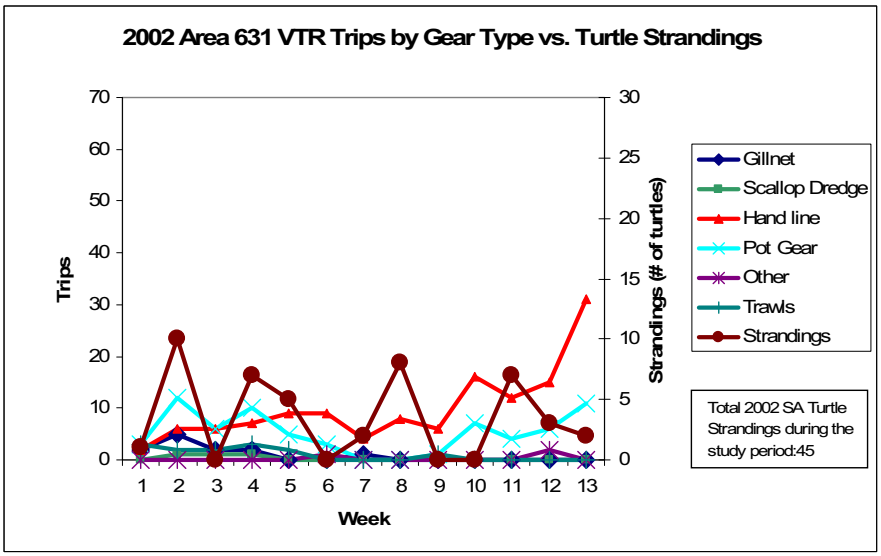


Figure A14. Statistical Area 631 2001-2003 VTR trips by gear type and turtle strandings. (Note trip and strandings axes are on a different scale than VMRC figures.)





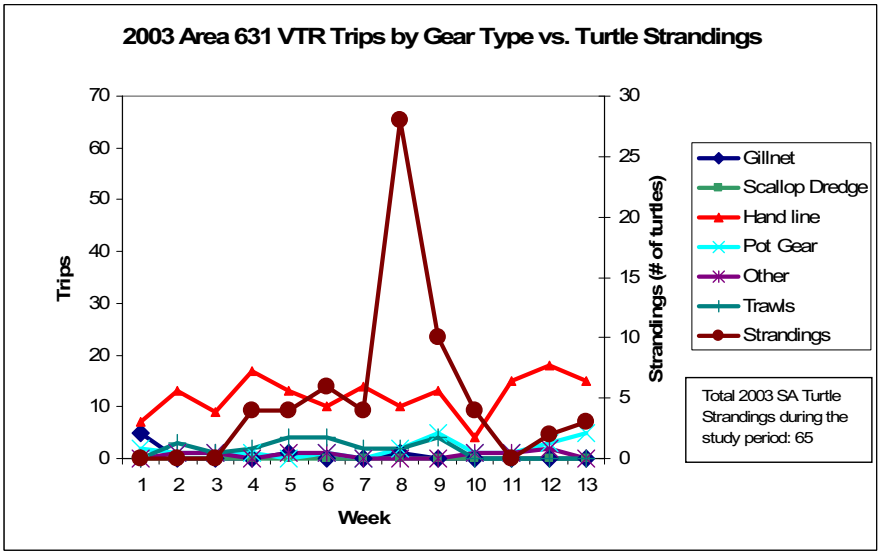
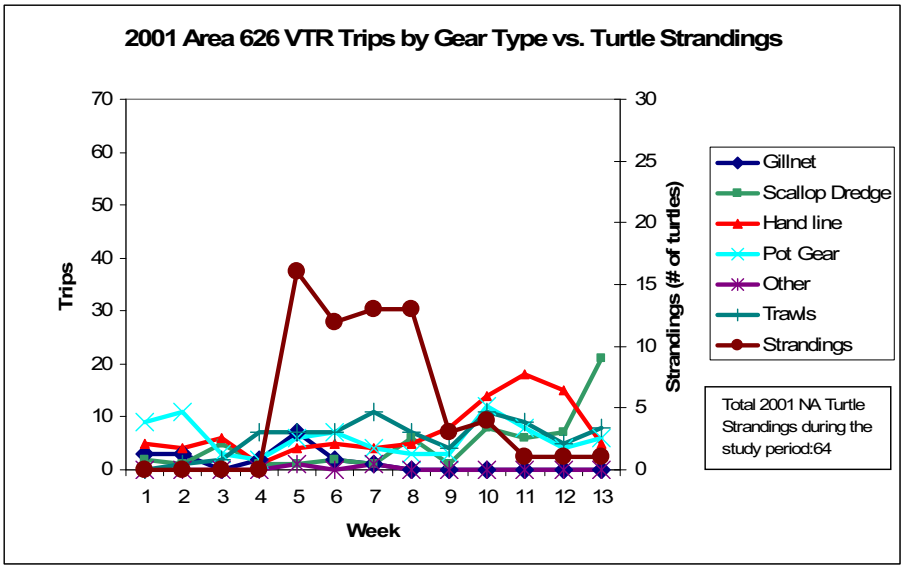
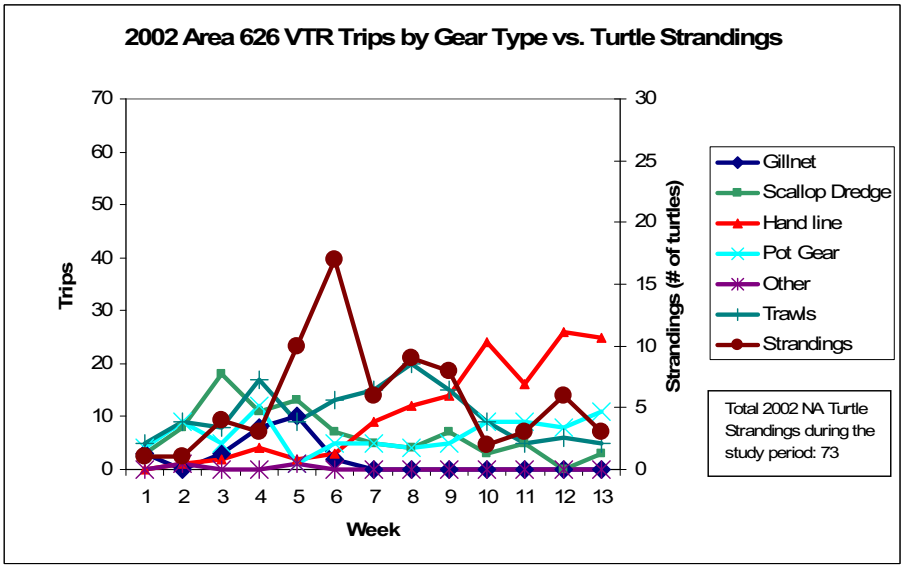


Figure A15. Statistical Area 626 2001-2003 VTR trips by gear type and turtle strandings. (Note trip and strandings axes are on a different scale than VMRC figures.)





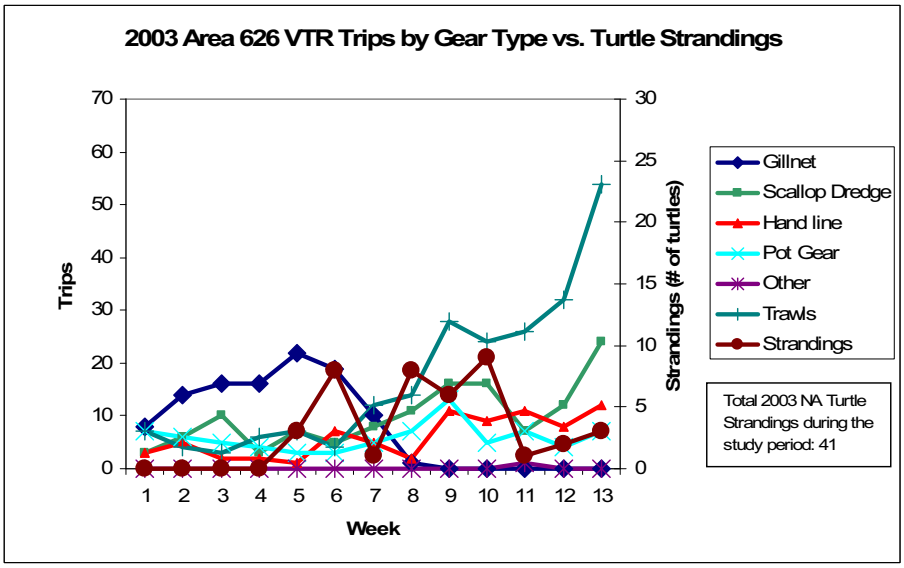
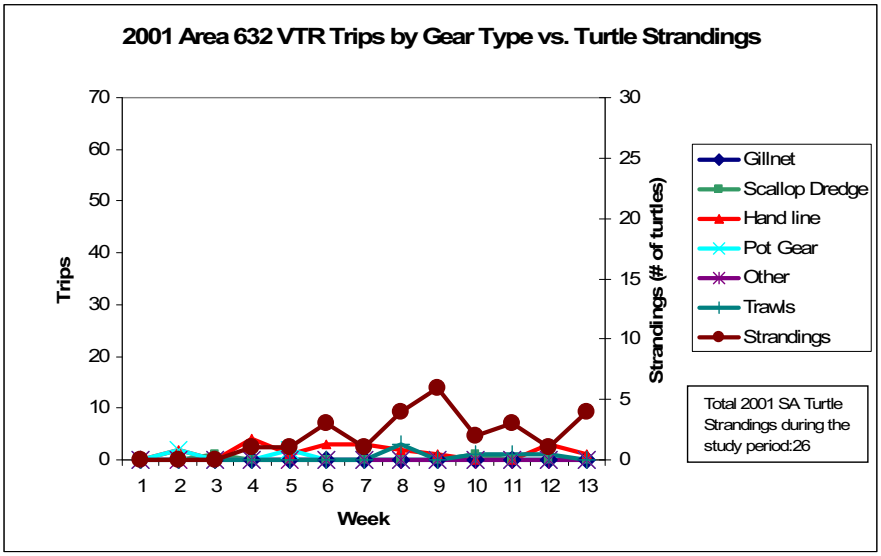
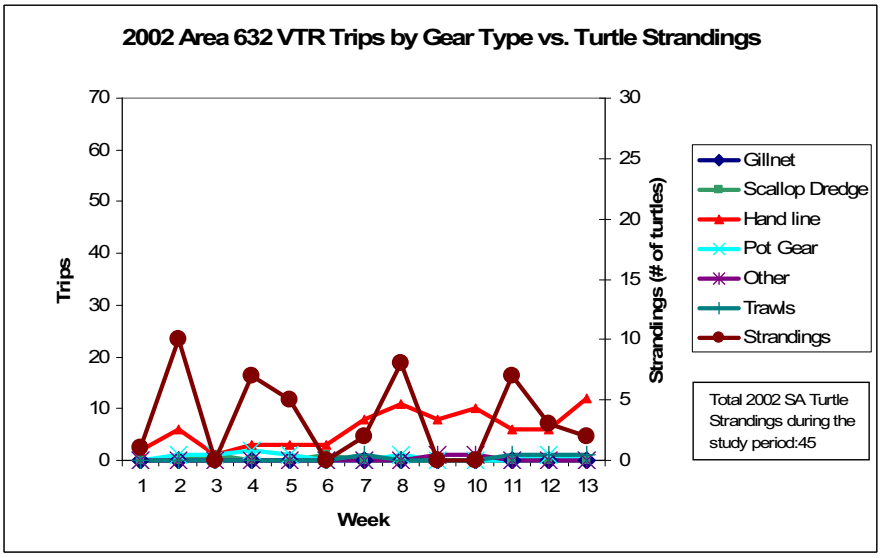
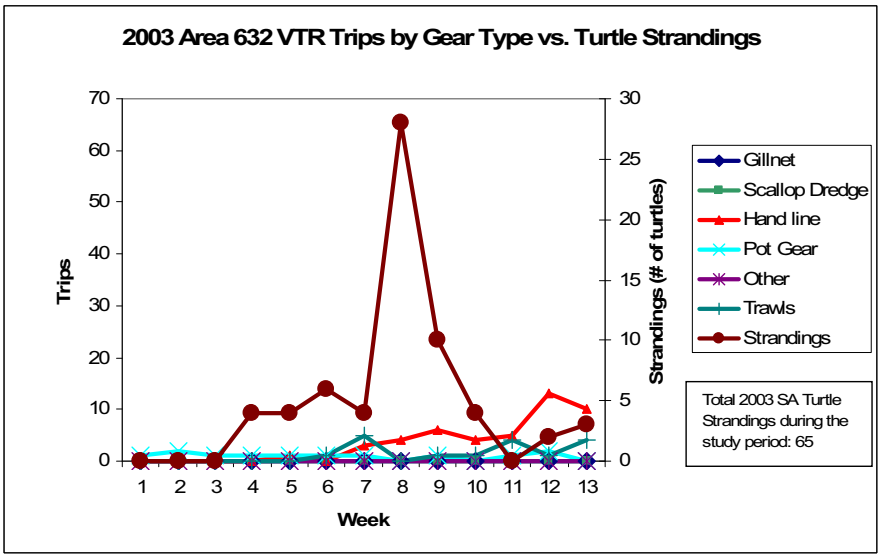


Figure A16. Statistical Area 632 2001-2003 VTR trips by gear type and turtle strandings. (Note trip and strandings axes are on a different scale than VMRC figures.)







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