Analysis of Shoreline Permit Activity in San Juan County, Washington 1972-2005

Aerial Photo of Fisherman's Bay, Lopez Island by Mark Gardner

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Executive Summary

With over 400 miles of shoreline located at the confluence of Puget Sound, Georgia Strait and the Strait of Juan de Fuca, the nearshore marine habitats of San Juan County play a critical role in the regional ecosystem. Protection of nearshore habitat has been identified at the local and regional levels as the most important salmon recovery strategy for the San Juan Archipelago. The same forage fish species and nearshore habitats of interest in salmon recovery are also vital to the protection and restoration of additional key marine species including six stocks of Puget Sound rockfish; multiple species of seabirds, including the federally threatened Marbled murrelet; and the federally threatened Southern Resident Killer Whale. The majority of shoreline development activity in San Juan County occurs through incremental single-family development and individual shoreline alterations. The magnitude of these impacts may only become evident cumulatively over time. To date, no attempt has been made to analyze the impacts of incremental shoreline development.

While shoreline species and habitats have been studied and mapped, San Juan County's land use policies and permit procedures have not been systematically examined to determine if existing regulations are achieving their intended goals and providing adequate resource protection. In addition, no attempt has been made to examine the spatial distribution or trends of shoreline permitting activities. Such analyses are essential to support an evaluation of cumulative impacts and to determine what policy or administrative changes, if any, are needed to ensure adequate protection of vitally important shoreline habitats.

Shoreline Permit Analysis

Friends of the San Juans' *San Juan County Shoreline Permit Analysis, 1972-2005* completes an initial, spatially explicit analysis of major shoreline permit activity in San Juan County from 1972 through 2005. Analysis of existing shoreline development activities in major permit categories provides an objective basis for an informed discussion of future shoreline development and nearshore marine protection in San Juan County. The *Shoreline Permit Analysis* provides a baseline for a detailed retrospective analysis of shoreline land use activity and future planning processes. In addition, project results can be used to further our understanding of the relationship between shoreline development and nearshore habitat condition.

The *San Juan County Shoreline Permit Analysis, 1972-2005* involved the following primary project elements:

- Creation of searchable Access and spatially explicit GIS (Arc 9.2) permit databases;
- Temporal and spatial assessment of shoreline permit activity in San Juan County from 1972 to 2005;
- Shoreline policy analysis linked to major changes in county code and priority shoreline habitats (eelgrass and forage fish);
- Identification of additional programmatic research and analysis needs; and
- Recommendations to improve shoreline protection.

Key Findings

Shoreline Permit Activity by Project Type:

- Total shoreline permit activity with tax parcel data for shoreline parcels was analyzed for the following categories: aquaculture, barge, beach access, boat house, boat ramp, bulkhead, clearing and grading, dock, guesthouse, logging, marine railway, mooring buoy, setback, shoreline, stormwater and transient rental and included: 2,607 permits, an annual rate of 77 permits per year. Of these, 1,642 (62%) occurred between 1972 and 1999, an annual rate of 59 permits and 927 (38%) occurred from 2000-2005, an annual rate of 155 permits.

Shoreline Permit Activity by Permit Type:

- 43% of land use permits included in this *Shoreline Permit Analysis* were exemptions.
- 26% of land use permits included in this *Shoreline Permit Analysis* were substantial developments.
- 14% of land use permits included in this *Shoreline Permit Analysis* were violations.

Shoreline Building Permits:

- From 1992 to 1999 residential building permit activity on shoreline parcels involved 816 permits, an annual rate of 102 permits per year. 930 permits were issued for residential building activities on shoreline parcels from 2000-2005, an annual rate of 155 permits.

Shoreline Permit Policy Analysis:

- Dock permit activity on shoreline parcels with eelgrass present from 1972 to 1992 included 107 permits, a rate of 5 per year. Dock permit activity on shoreline parcels with eelgrass present from 1993 to 2005 (after adoption of increased protection of eelgrass as a marine habitat area under the environmentally sensitive areas section of county code) included 133 permits, a rate of 10 per year. 48% of dock permit activity from 1972 to 1993 occurred on parcels with eelgrass present. After eelgrass protections were implemented, from 1993 to 2005, the percentage of dock permit activity on parcels with eelgrass present was essentially unchanged, at 50%.
- Bulkhead permit activity on parcels with forage fish spawning from 1972-1992 included 9 permits, an annual rate of 0.42 per year. Bulkhead permit activity on parcels with forage fish spawning from 1993-2005 (after adoption of increased protection of spawn sites as marine habitat areas under the environmentally sensitive areas section of county code) included 11 permits, an annual rate of 0.85 per year. The percentage of bulkhead permit activity on parcels with forage fish spawn declined slightly after the adoption of environmentally sensitive areas policies, to 9% (1993-2005) from 11% (1972-1992).

Conclusions and Recommendations

Friends of the San Juans' *Shoreline Permit Analysis for San Juan County, 1972-2005* resulted in three main conclusions. First, the San Juan County Department of Community Planning and Development's Permit Database does not support analysis of shoreline (or inland) development

activities. Significant changes to the database are needed to support the analysis of individual and cumulative impacts as directed by the Shoreline Management Act.

Second, analysis of shoreline permit activity raises serious management concerns about the incremental and cumulative impacts of shoreline development in the San Juans. Increasingly high permit activity levels, diverse project types and broad geographic distribution of shoreline development actions on San Juan County shorelines support the need for a cumulative impact analysis of shoreline development activity in the County.

Third, policy analysis results indicate that protection of 'marine habitat areas' in the Interim Environmentally Sensitive Areas section of San Juan County Code is not reducing the numbers, annual rates or percentages of shoreline project permit activity within protected habitats for the two project and habitat types we investigated: docks associated with eelgrass habitat and bulkheads associated with forage fish spawning habitat.

Recommendations from Friends of the San Juans' *San Juan County Shoreline Permit Analysis, 1972-2005* fall into four primary categories, including:

1) improved permit recording;

2) improved implementation of policy and code;

3) additional research; and

4) cumulative impact assessment.

Analysis of Shoreline Permit Activity in San Juan County, Washington 1972-2005

Introduction

Washington State's Puget Sound region is a hotspot for biological diversity in the United States. Puget Sound's marine waters are home to more than 220 species of fish, 26 different kinds of marine mammals, 100 species of seabirds and thousands of marine invertebrate species. Located at the confluence of Puget Sound, Georgia Strait and the Strait of Juan de Fuca, San Juan County's 400 miles of shoreline habitat is vital to regional marine species. San Juan County provides forage fish spawning sites, extensive eelgrass meadows and kelp beds and offers feeding, refuge and migration corridors for threatened species including Chinook salmon, Marbled murrelet and the southern resident Orca. Protection of these complex, highly productive and dynamic nearshore habitats has been identified at the local and regional levels as the most important salmon recovery strategy for the San Juan Archipelago.

San Juan County's population is increasing at unprecedented rates with development concentrated along the shoreline. As development in San Juan County intensifies, environmentally sensitive areas are increasingly at risk. Primary threats to nearshore habitats include home and dock construction, shoreline armoring, vegetation removal, stormwater runoff, exotic species introduction, sedimentation, and failing septic systems. As the majority of shoreline development activity in San Juan County occurs through incremental single-family development and individual shoreline alterations, the magnitude of these impacts may become evident cumulatively over time.

While shoreline species and habitats have been studied and mapped, San Juan County's land use policies have not been systematically examined to determine if existing regulations are adequate. For example, current San Juan County planning codes allow for shoreline armoring in critical habitat areas without public review or notification of neighbors and citizens. In addition, no attempt has been made to examine the spatial distribution or trends of shoreline permitting activities. Such analyses are essential to support an evaluation of cumulative impacts and to determine what policy or administrative changes, if any, are needed to ensure adequate protection of critical shoreline habitats.

Friends of the San Juans' *Shoreline Permit Analysis* conducted an initial, spatially explicit analysis of major shoreline permit activity in San Juan County from 1972 through 2005. Analysis of existing shoreline development activities in major permit categories provides an objective basis for an informed discussion of future shoreline development and protection in San Juan County. The Project provides a baseline for future planning processes and a more detailed retrospective analysis of shoreline land use activity. In addition, project results can further understanding of the relationship between shoreline development and nearshore habitat condition. Funding support for the *San Juan County Shoreline Permit Analysis* was provided to Friends of the San Juans by The Russell Family Foundation, The Northwest Fund for the Environment and the Washington Department of Ecology.

Background

Priority Species and Habitats

With over 400 miles of marine shoreline located at the confluence of Puget Sound, Georgia Strait and the Strait of Juan de Fuca, the nearshore marine habitats of San Juan County play an important role in regional salmon, seabird and orca recovery efforts.

Salmon

Local shorelines provide forage fish spawning sites, extensive eelgrass prairies and offer feeding, refuge and migration corridors for a range of salmon life history stages and species. Juvenile salmon move along the shallows of estuaries and nearshore areas during their out migration to the sea, and may be found in these habitats throughout the year depending on species, stock, and life history stage. The waters of San Juan County are rich in nutrients and food for marine organisms. Maintaining the food web around the islands is a critical component of salmon recovery efforts (Shared Strategy 2005).

Chinook Salmon

All twenty-two populations of Puget Sound Chinook salmon use the San Juans for feeding on their way out to sea and on their return (Kerwin 2002, Shared Strategy 2005). In addition to hosting significant resources for the nearshore dependant Chinook and Coho salmon, the waters of the San Juans are also utilized by chum, sockeye and pink salmon during some portion of their

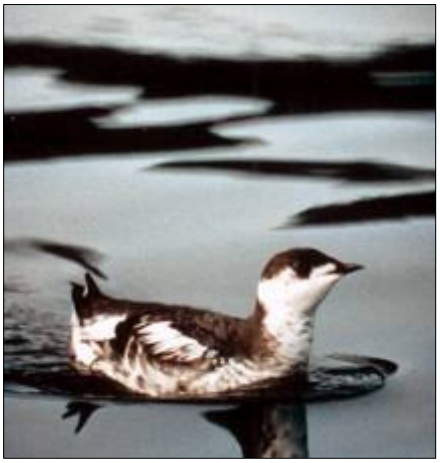
life cycle. Salmonid use in San Juan County waters is concentrated in shallow-water nearshore marine environments as well as connected estuarine and lower freshwater habitats.
Emerging empirical evidence indicates that nearshore-associated freshwater habitats including pocket estuaries and streams offer juvenile salmon refuge from predation, increased food resources like insects and additional time to make the physiological transformation from freshwater to saltwater (Shared Strategy 2005). While quantitative studies are limited, a combination of historical and anecdotal reports describe salmonid use of multiple estuarine and freshwater habitats in San Juan County. Recent field research at lower stream habitat sites on Orcas and San Juan Islands documented the presence of salmonid species of multiple age classes and species, including Coho, chum and sea run cutthroat (Echeverria and Barsh 2006).

Orca

The Southern Resident Killer Whale population, otherwise known as the Orca whale, spends approximately seven months in the marine waters of San Juan County. The Orca was listed as endangered under the Endangered Species Act in 2005. Research indicates that Chinook salmon are the Orca's primary prey in the San Juan Archipelago, with other salmon species making up a lesser proportion of their total diet. Orcas have also been observed feeding directly on large schools of Pacific herring. Lack of adequate food resources is believed to be a limiting factor. Food web support through protection of nearshore habitat is an essential component of Chinook salmon, and Orca, recovery efforts.

Orca swimming along Lime Kiln Park

Seabirds



Marbled Murrelet

Numerous species of seabirds feed in the rich waters of the San Juan Archipelago, including the federally listed Marbled murrelet. Marbled murrelet's forage primarily on small fish in the nearshore marine environment. The numbers of Marbled murrelets observed in the San Juan Islands increases dramatically each spring and summer, reflecting the good feeding conditions here. Murrelets nesting on Vancouver Island have been documented making regular round trips of 120 miles, collecting forage fish in the waters of San Juan County. Protection of old growth forests for nesting habitat and maintenance of healthy forage fish populations are critical elements of Marbled murrelet recovery efforts. Over 40 species of birds in the region also rely on forage fish as an important prey resource.

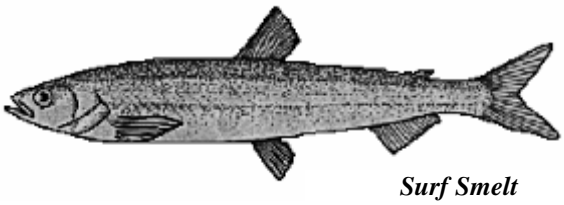
Forage Fish

With the listing of many Puget Sound salmon stocks as threatened or endangered, the issue of maintaining forage fish stocks has been identified as a high priority (Shared Strategy 2005, Moulton and Penttila 2000). Forage fish are a significant part of the prey base for salmon, marine mammals, seabirds, and other predatory finfish populations in Washington State. Forage fish are also a valuable indicator of the health and productivity of the marine environment. All the important forage fishes in our region (Pacific herring, surf smelt and Pacific sand lance) depend on nearshore marine habitats for spawning and rearing. Protection of nearshore habitats utilized as spawning and rearing areas for forage fish will be required if salmon recovery is to be successful.

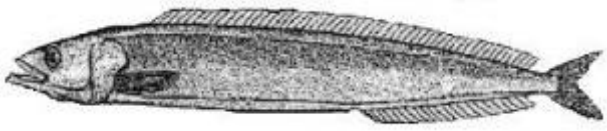
Other priority fish and wildlife species in San Juan waters that depend on forage fish as critical prey resources include six stocks of Puget Sound rockfish; multiple species of seabirds, including the federally threatened Marbled murrelet; and our resident marine mammal species. The same forage fish species and spawning habitat of interest in salmon recovery will also be vital for the protection and restoration of these additional key marine species.

Protection of existing high quality forage fish spawning habitat has been identified as a key conservation objective for the San Juans. Because forage fish and juvenile salmon depend on nearshore habitat for their survival, they are vulnerable to the impacts of shoreline development. Primary threats to forage fish habitat include: shoreline hardening, overwater structures, pollution runoff and removal of shoreline and aquatic vegetation.

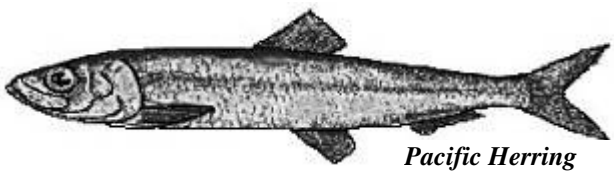
Just under 80 miles of potential forage fish spawning habitat were identified by Friends of the San Juans and the Washington Department of Fish and Wildlife in San Juan County during surveys conducted from July 2001 through December of 2003, representing 20% of local shorelines (Friends 2004). Surf smelt spawn has been documented at 59 sites in San Juan County, while Pacific sand lance spawn activity has been documented at eight beaches (Friends 2004, Penttila 1999). Two stocks of spawning Pacific herring are recognized by Washington Department of Fish and Wildlife in San Juan County (Penttila 1999). One stock spawns in the Westcott Bay/ Roche Harbor Region, while the other spawns in the East portion of the county, including: Mud and Hunter Bays on Lopez Island, in West Sound and Eastsound on Orcas Island and in Blind Bay on Shaw Island.



Surf Smelt



Pacific Sand Lance



Pacific Herring

Surf smelt spawn at the highest tides near the water's upper edge on coarse sand and pea gravel. Egg development is temperature dependent with marine riparian vegetation serving to maintain lower temperatures during the warmer summer months. Surf smelt are a significant part of the Puget Sound food web for larger predators. Spawning in northern Puget Sound occurs year round, while spawning in central and southern Puget Sound occurs in fall and winter. The limited extent of surf smelt spawning grounds makes them vulnerable to shoreline development and construction activities.

Surf Smelt Eggs

Pacific sand lance spawn at high tide in the upper intertidal area on sandy beach material. The fine sandy beach material coats the eggs and likely serves to assist in moisture retention when they are exposed during low tides. It also serves to conceal the eggs from predators. In Puget Sound, the spawning season is November 1 through February 15 with larvae commonly found between January and April in the Puget Sound area. Pacific sand lance are a significant dietary component of many economically important resources in Washington, such as juvenile salmon. It has been found that 35% of juvenile salmon diets are known to be Pacific sand lance. They are particularly important to juvenile Chinook with 60% of the juvenile Chinook diet represented by Pacific sand lance. Sand lance are also a key prey item for seabirds, including rhinoceros auklet and the threatened marbled murrelets. Their habit of spawning in upper intertidal zones of sand and gravel beaches makes them particularly vulnerable to the direct and cumulative effects of shoreline development.

Pacific sand lance spawning beach

Pacific herring typically utilize shallow subtidal habitats for spawning and juvenile rearing. Herring stocks in Puget Sound spawn at specific sites or 'grounds'. Herring spawn from the upper intertidal region to a depth of 40 feet, but most spawning is between 0 and –10 ft MLLW. Pacific herring spawning in the San Juans occurs from late January through early April. In San Juan County, spawning is generally on eelgrass (*Zostera marina*) or the fibrous red alga *Gracilariopsis.* The limited range of herring spawning areas and their location in nearshore marine environments make Pacific herring spawning grounds vulnerable to impacts from shoreline and upland development.

Herring eggs on eelgrass

Pacific herring are an important prey item for many marine organisms including marine mammals, seabirds and fish. Pacific herring have been found to comprise from 30% to 70% of diets for the following fish species: Chinook salmon, Coho salmon, Pacific cod, walleye Pollock, lingcod and Pacific halibut. Pacific herring spawn sites play an important role in the life history characteristics of scoters; with the eggs providing a critical energy source just before the birds make their annual journey to their Alaskan and Canadian breeding grounds.

Eelgrass

Nearshore, shallow-water beds of eelgrass provide food and shelter for over 70 species of fish and innumerable invertebrates. The native eelgrass (*Zostera marina*) is considered a "keystone" species in the Pacific Northwest, providing critical habitat for hundreds of important marine species, including juvenile salmon, Pacific herring, black brant, river otters and Dungeness crab (Dowty et al. 2005). Each blade of eelgrass is a small food factory. Diatoms, bacteria, and detritus (decaying plant and animal matter) gather on eelgrass leaves. This detritus provides food for many invertebrates; isopods, amphipods, polychaete worms, brittle stars, and some clams. The large number of invertebrates present makes eelgrass beds rich feeding areas for fish and marine birds. Eelgrass also provides structural complexity to the nearshore that functions as habitat, mitigates wave energy and traps fine sediments.

Eelgrass

Connectivity of eelgrass communities can play an important factor in habitat character, supporting salmon as they move through the nearshore. Comprehensive eelgrass mapping completed by Friends of the San Juans in partnership with the University of Washington and the Washington Department of Natural Resources in 2004 documented 140 miles of eelgrass in San Juan County, distributed along bays, beaches and offshore banks (Friends et al. 2004).

Kelp

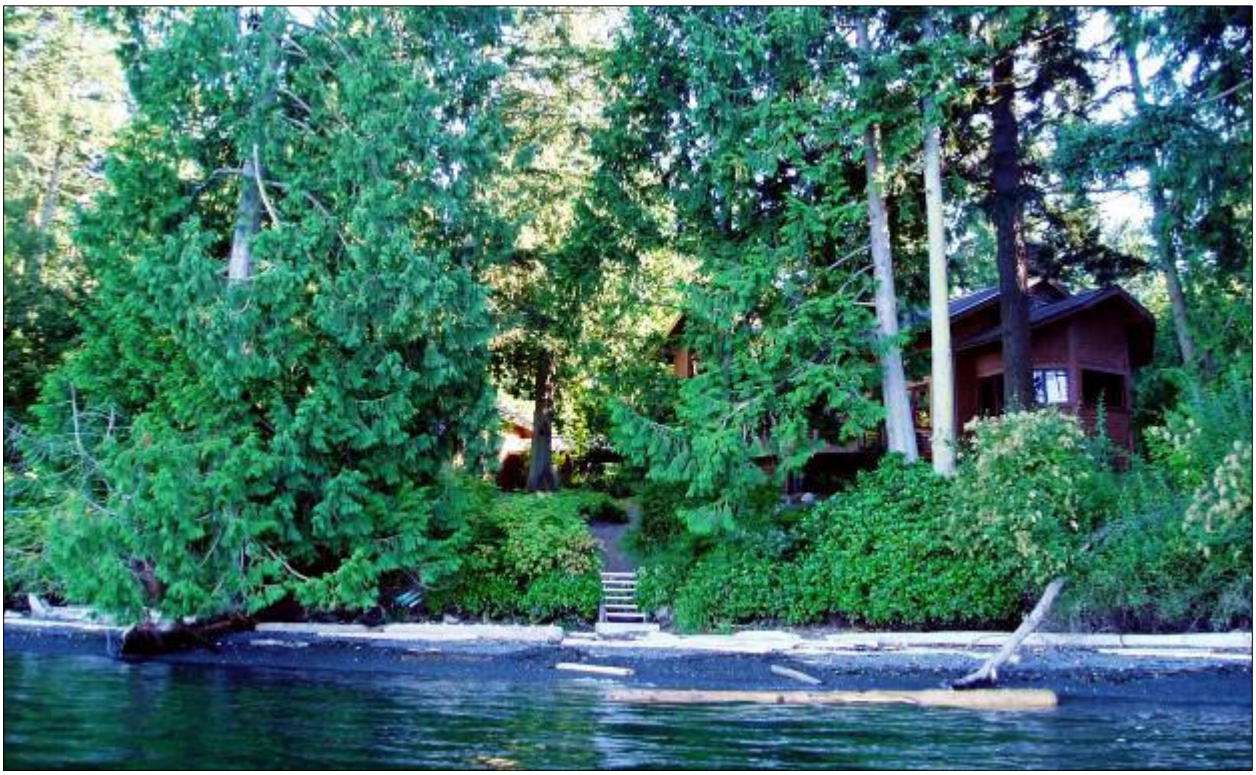
Kelp is a benthic algae in the order Laminariales (Duggins *et al*. 2003). In lay terms, most large brown algae (i.e. not red or green) attached to the seabed in this region are kelps. Kelps provide many ecosystem services, such as primary ecosystem productivity as well as habitat for many organisms, including marine mammals, fish and invertebrates (Dayton 1985, Steneck *et al*. 2002). Many invertebrates in San Juan County rely on drift algae as a food supply, especially urchins (Britton-Simmons, *pers. com.*). Kelps provide physical habitat structure on the seabed. Kelp has been shown to dampen waves and hence the energy regime on beaches. This in turn influences beach sediment grain size and sediment biotic suitability such as suitability for beach spawners (Mumford, *pers. com.*). Salmon use kelp habitats. Simenstad *et al.* (1979) found chinook, coho, and chum salmon in kelp beds of the Strait of Juan de Fuca. Kelp habitats are very important to juvenile fishes. Young-of-the-year copper and quillback rockfish strongly associate with understory kelp (Hayden-Spear 2006). Bull kelp "forests" are especially important habitat for very young copper rockfish that settle into shallow reef habitats from the plankton (Haldorson and Richards 1987). San Juan County has approximately one third of the bull kelp found in the inland waters of Washington State.

Bull kelp

Marine Riparian Habitat

Shoreline vegetation plays an important role in the health of the nearshore marine environment (Brennan and Culverwell 2004, Rice 2006). Coastal forests provide shade to forage fish spawning habitat, protecting eggs from high summer temperatures. Marine riparian areas support marine food webs through detritus and prey items. Marine riparian areas also provide bank stability and water quality benefits and a source of large, woody debris which can help build backshore areas. Intact marine riparian forests help maintain natural beach slope which tends to maximize the shallow nearshore water areas critical for fish such as juvenile salmon. Diet studies have shown significant numbers of terrestrial insects in juvenile salmon stomachs, with higher numbers in samples collected in nearshore regions with intact marine riparian vegetation (Sobocinski 2003).

Research conducted by Washington Department of Fish and Wildlife across Puget Sound found that survival of incubating summer surf smelt eggs was significantly higher at beaches with good shade from intact marine riparian forests, suggesting that attention should be paid to protecting these habitats (Penttila 2001). A recent, more detailed study evaluated differences between natural and modified (shoreline armoring and reduced shoreline vegetation) beaches in terms of microclimate and surf smelt egg survival. The proportion of smelt eggs containing live embryos on the altered beach was approximately half that of the natural beach (Rice 2006). Comprehensive information on current marine riparian habitat conditions (e.g. diversity, width, connectivity, etc.) is not available for San Juan County.



Marine Riparian Habitat

Shoreline Threats

The largest threat to shoreline habitat in San Juan County is the incremental impact of shoreline development (Shared Strategy 2005). More shoreline habitat is lost from the cumulative impacts of many smaller projects than from major construction projects. Because forage fish and juvenile salmon depend on nearshore habitat for their survival, they are vulnerable to the impacts of shoreline development. Primary threats to forage fish, aquatic vegetation and juvenile salmon habitat include bulkheads, boat ramps and barge landings, docks, roads, stormwater outfalls, vegetation removal and pollution from runoff associated with shoreline development.

The addition of structures or material along the shoreline to decrease the impact of waves and currents or to prevent the erosion of banks or bluffs is one of the major contributors to loss of shoreline habitat across Puget Sound (Williams and Thom 2001, Zelo et al. 2000, Carrasquereo et al. 2005). Primary sources of shoreline armoring in San Juan County include residential bulkheads and seawalls and rip rap associated with infrastructure such as roads, boat ramps, docks and culverts.

Boat ramps impact nearshore habitat by physically covering the intertidal habitat, and can also impact sediment transport along beaches (Williams and Thom 2001). Boat ramps are often associated with damage to eelgrass, primarily through boat and prop scour waterward of the structure; this damage ranges widely in significance depending on the beach profile and boat and tidal use conditions. Both improved and unimproved boat ramps and barge landings used at inappropriate tidal elevations can damage plants directly through contact with the boat or prop scour (Nightingale and Simenstad 2001).

Docks can have structural and biological impacts to nearshore marine environments, including shading of eelgrass and other light dependent species (Nightingale and Simenstad 2001). Piers and floats block the sunlight that eelgrass requires to grow. Dock construction causes physical disturbances and noise impacts. Structural elements (e.g. pilings) can alter shallow water fish movement and use patterns. Depending on materials used and maintenance conditions, docks can also be polluters, acting as sources of creosote and Styrofoam.

Residential shoreline development, bulkheads and docks

Shoreline development activities disrupt hydrologic and functional connections between freshwater systems such as estuarine wetlands and freshwater streams from the marine environment (Kerwin 2002, Shared Strategy 2005). This disconnect alters the transport of sediment and nutrients, affects water quantity and quality and is often a barrier to species movement between the two environments.

Riparian areas, the habitats at the interface between land and water, are often referred to as ribbons of life because of the large number of species they benefit. Removal of vegetation along marine shorelines reduces shade for incubating forage fish eggs, increases bank erosion, reduces nutrient inputs to the marine ecosystem, degrades water quality and removes wildlife habitat. Most shoreline development activities in San Juan County negatively impact marine riparian habitats, including clearing and grading, residential and guest buildings, beach access and boating facilities including boat ramps, barge, docks and boathouses. Illegal removal of shoreline trees and native vegetation is recognized as a common problem associated with residential development within the County.

In San Juan County, non-point pollution sources such as failing septic systems, sediments, chemicals, oil and fertilizers carried in runoff are the primary contributor of pollution to beach habitat. A potential catastrophic event such as an oil spill is also a threat. Stormwater can alter beach habitat conditions and geologic processes through increased erosion, concentrated flows and direct impacts of the physical infrastructure such as outfall pipes and associated rip rap.

Water quality conditions are critically important to the health of eelgrass and other submerged aquatic vegetation (Dowty et al. 2005). As fixed organisms, these plants are susceptible to changes in temperature, light, nutrient and chemical conditions. Threats to eelgrass and kelp include logging, clearing and grading, stormwater and other shoreline development activities that send sediments into bays and nearshore waters, limiting light and covering nearshore habitat with sediments.

Beach access and associated armoring

Shoreline Protection

Local, state and federal policies and regulations recognize the importance of shoreline resources and in combination work to minimize damage from development activities. Washington State's Shoreline Management Act (SMA) was adopted by the public in a 1972 referendum to "prevent the inherent harm in an uncoordinated and piecemeal development of the states shorelines." Compliance with the SMA is implemented at the local level with guidance from the Department of Ecology. State Hydraulic Code rules and provisions of the Federal Clean Water Act also engage state and federal agencies (Washington Department of Fish and Wildlife, Army Corps of Engineers) in the permitting and review of shoreline development activities in San Juan County when they occur below ordinary and mean higher high water, respectively. The listing of multiple species of salmon, Marbled murrelet and the Southern Resident Killer Whale species under state wildlife protection laws and the federal Endangered Species Act has elevated the importance of protecting critical habitat and food web linkages in counties throughout Puget Sound. These listings have resulted in additional agency involvement in shoreline policy and project guidance (United States Fish and Wildlife Service, National Marine Fisheries Service, National Oceanic and Atmospheric Administration).

Protection of nearshore marine habitat has been identified as the most important salmon recovery strategy for the San Juan Archipelago at both the local and regional scale by Shared Strategy for Puget Sound, the Washington State Salmon Recovery Funding Board, the Puget Sound Action Team, and the San Juan County Marine Resources Committee. Protection of nearshore habitats and food webs are also key recovery components for endangered Orca whales the threatened Marbled murrelet. San Juan County has direct management responsibility for extensive nearshore marine habitat resources through direct ownership of shoreline parcels, plan and project review, management of infrastructure and administration of its Shoreline Master Program pursuant to the Shoreline Management Act. A related project, the San Juan County Nearshore Impact Assessment (FSJ 2006) identified priority habitats and species in relation to known shoreline threats on county property and infrastructure but did not address the county's role in project review and implementing protection policies under the Growth Management Act and the Shoreline Management Act.

A considerable effort is going into shoreline and marine protection and restoration projects such as culvert enlargement, shoreline modification removal and the acquisition of shoreline property. Little attention or resources are being allocated to the programmatic aspects of shoreline protection and restoration such as land and shoreline regulatory programs and policies, response to code violations, mitigation, and shoreline land use and building project review and permitting. Many of the habitat restoration and enhancement project activities underway today are a direct result of land use policies and practices of the past. While resource protections under the current regulatory regime are much improved, programmatic evaluations are needed to determine if policies are in fact resulting in resource protection; which can reduce the need for expensive, and often infeasible, restoration measures in the future.

Review of permit activity can provide insight into numerous important policy questions, such as:

- Are current local land use regulations working as intended?
- Do the policies achieve resource protection?

- Is there data to support geographically applied protections?
- Are there problem areas in implementation that are limiting overall effectiveness?
- How can cumulative impacts be evaluated?

Friends of the San Juans' *San Juan County Shoreline Permit Analysis, 1972-2005* takes a preliminary step towards these programmatic evaluation objectives by:

1) Conducting a temporal and spatial assessment of shoreline permit activity in San Juan County from 1972 to 2005;
2) Completing a shoreline policy analysis linked to major changes in county code and priority shoreline habitats (eelgrass and forage fish spawning beaches);
3) Identifying additional programmatic research and analysis needs; and
4) Supporting future analysis through creation of a searchable Access and spatially explicit GIS (Arc 9.2) product.

Methodology

Land Use Permit Activity Database Development

To support a spatially explicit analysis of land use permit activity on shoreline parcels within San Juan County, Friends of the San Juans developed a searchable Access database and associated GIS (Arc 9.2) database. The primary data source for this project was the San Juan County Permit Database. Secondary data sources included the San Juan County Assessors Database, San Juan County Assessors Parcel Map and Friends of the San Juans nearshore habitat spatial data layers. While the County's own permit databases were used as the foundation of the project, an additional searchable, standardized descriptive column was created to support analysis. Currently San Juan County enters permits into a database to store records. The current county permit database does not support data retrieval or analysis. As a result, the county's permit database does not include standardized fields that describe major project activities and project description entries vary widely in terminology, level of detail and length, making analysis by project type virtually impossible.

The first, major project activity was a manual review of the County's Land Use Permit Databases and the addition of a new, searchable descriptive column. For example, County Permit Database descriptions grouped under the new descriptive *Beach Access* column added by Friends of the San Juans included: "stairs to beach", "road and stairs to beach", "illegal ramp to beach", "19 steps 3 feet wide beach stairs", "repair to staircase without an exemption", "cable car/stairs to beach" and "after the fact stairs." The resulting version of the county permit database used in this project maintains all existing county records intact, but provides one additional column with a short, searchable project activity type category to allow analysis of records. The following project activity categories from the County's Land Use Permit Database were included in the copy of the County Land Use Database with the additional, searchable column: aquaculture, barge, beach access, boathouse, boat ramp, bulkhead, clearing and grading, docks, guesthouse, logging, marine railway, mooring buoy, setback, shoreline, stormwater and transient rental.

County permit records are also divided into 'old' and 'new' databases, with variations in methods and detail between the two systems. Because the differences between the 'old' and 'new' County databases are significant, and because the County itself maintains them as separate databases, we did the same, essentially copying both databases and adding the same additional column with matching searchable descriptions to each. The searchable database for the selected categories of project types also included the County Land Use Permit Database information on permit type, including: development, exemptions, variances and violations. A detailed description of the methodology used to develop a copy of the county databases suitable for analysis is provided in Appendix A. *San Juan County Shoreline Permit Database Analysis README.doc*.

Both updated databases (old and new land use permit) were then developed as a spatially explicit GIS project in Arc 9.2; by joining them with the County Assessor's Parcel Database of the same end date, November 2005. ArcGIS software was then used to select the subset of marine shoreline parcels for the primary project categories to be used in the analysis. Analysis was conducted for shoreline activities only.

As some records in the San Juan County Land Use Permit Database do not include parcel numbers or because parcel numbers are incorrectly entered in the database, spatially explicit analysis was not possible for 100% of shoreline permits. However, for each project and permit type, the number of permits with parcel data, and thus included in the mapping elements of the project, are noted. In addition, while the project uses the best available county information available, slight discrepancies in the parcel-based data are possible as the project includes over 20 years of records and the San Juan County Assessor reassigns parcel numbers for numerous reasons and does not maintain a readily available mechanism for tracking these changes. As a result, project results represent a conservative, or minimum accounting of permit activity, as it includes only those permits with tax parcel information recorded in the database, a subset of the total permit activity.

Shoreline Permit Activity Analysis

A spatially explicit analysis of all shoreline land use permits was conducted to determine the number, rate and location of selected project activity types on shoreline parcels. Project categories in this analysis included: aquaculture, barge, beach access, boathouse, boat ramp, bulkhead, clearing and grading, dock, guesthouse, logging, marine railway, mooring buoy, setback determination, shoreline, shoreline violation, stormwater and transient rental. While some of these project activities can occur on inland and shoreline parcels (clearing and grading, guesthouse etc.) this analysis project included permit activities on shoreline parcels only. Permit type was also described for the three top permit type categories, including substantial development, exemptions, and violations. Results were mapped and analyzed in multiple ways, including total number, annual rate and percentage of total developed shoreline parcels. Analysis of permit type was conducted with the subset of the San Juan County Permit Database that included tax parcel information, the same subset used in individual permit activity analysis of permit type for each project category and included in project maps.

Building Permit Activity Spatial Database Development

To further inform analysis of shoreline permit activity within San Juan County, analysis of the San Juan County Building Permit database was also conducted for shoreline parcels. Unlike the County Land Use Database, building permit activity with tax parcel information was only available starting in mid 1992, apparently a result of the different database systems that have been utilized by the formerly separate and now combined building and land use departments over the years and the only partially successful merged database that currently exists. While building permit data appears in the database starting with the 1991 records, parcel numbers are not recorded until midway through the 1992 permit records. All recorded building permit activity with parcel numbers was compiled by year and the subset of those occurring on marine shoreline parcels was selected in Arc GIS for inclusion in the shoreline permit analysis.

Policy Analysis of Shoreline Permit Activity

In addition to the spatially explicit analysis of shoreline permit activity by project type, permit type, and year, an attempt was made to evaluate permit activity in relation to key policy changes within the county. While many other factors, such as the overall rates of growth and permit activity complicate this analysis, this type of analysis can provide an initial assessment of whether policies are having their intended effect. Three primary policy analyses were conducted including: shoreline permit activity rates related to major changes in San Juan County Code; the rate of dock permit activity related to increased eelgrass protection; and the rate of bulkhead permit activity related to increased protection of forage fish spawning beaches. Policy analyses were conducted with the subset of the San Juan County Permit Database that included tax parcel information, the same subset used in individual permit activity analysis of permit type for each project category and included in project maps.

Shoreline Permit Analysis by Project Type

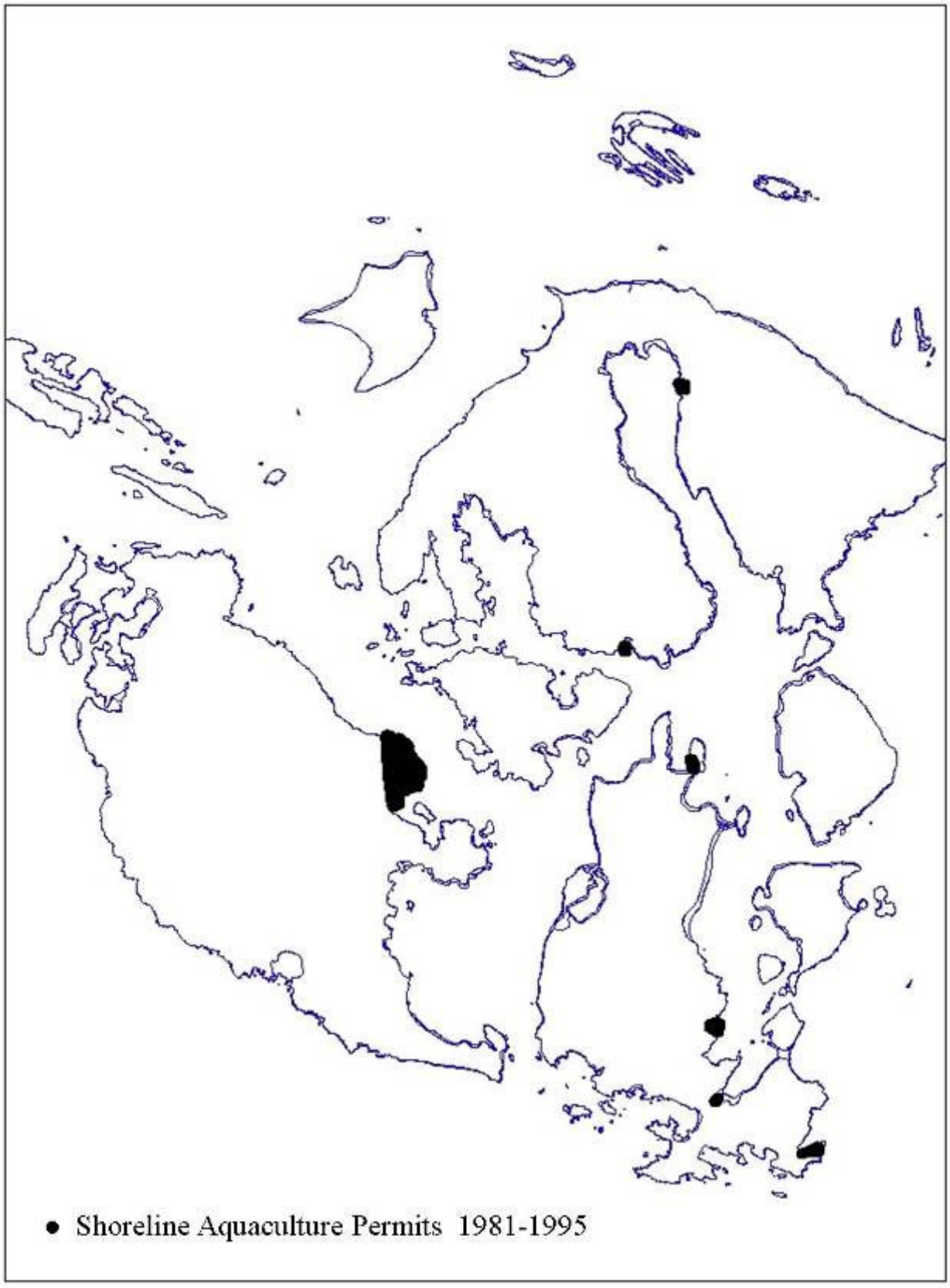
Aquaculture:

San Juan County Code defines *Aquaculture* as **"**the science or art of cultivating fish, shellfish, or other aquatic animals or plants" (SJCUDC 18.20). Twenty eight permits for aquaculture have been issued in San Juan County, all between 1981 and 1995, an annual rate of 0.9 per year. Aquaculture permit activity included 15 commercial, ten private and two public projects. Project activities were described as the following: mussels (8), undefined aquaculture (5), oysters (4), salmon (2), floats/rafts (2), nori nets (2), edible seaweed (2), abalone (1), habitat enhancement (1) and shellfish (1). Of the 28 aquaculture permits, one was a PA (undefined county permit database); 11 were shoreline permits (nine to establish, two for expansion) and 16 were exemptions (ten to establish and six to install). No permits for aquaculture have been issued in San Juan County since 1995. As tax parcel numbers are only recorded for a small subset of the total aquaculture permit activities in the County's 'old' Land Use Database just 7 aquaculture permits with parcel information (25%) are included in the spatially explicit components of this project.

Table 1. Aquaculture Permit Activity

Permit Type	*Aquaculture Permits 1981-1995*
Substantial development	11
Exemption	16
PA (undefined term)	1
Total aquaculture permits	*28*

Westcott Bay Oyster Farm


• Shoreline Aquaculture Permits 1981-1995

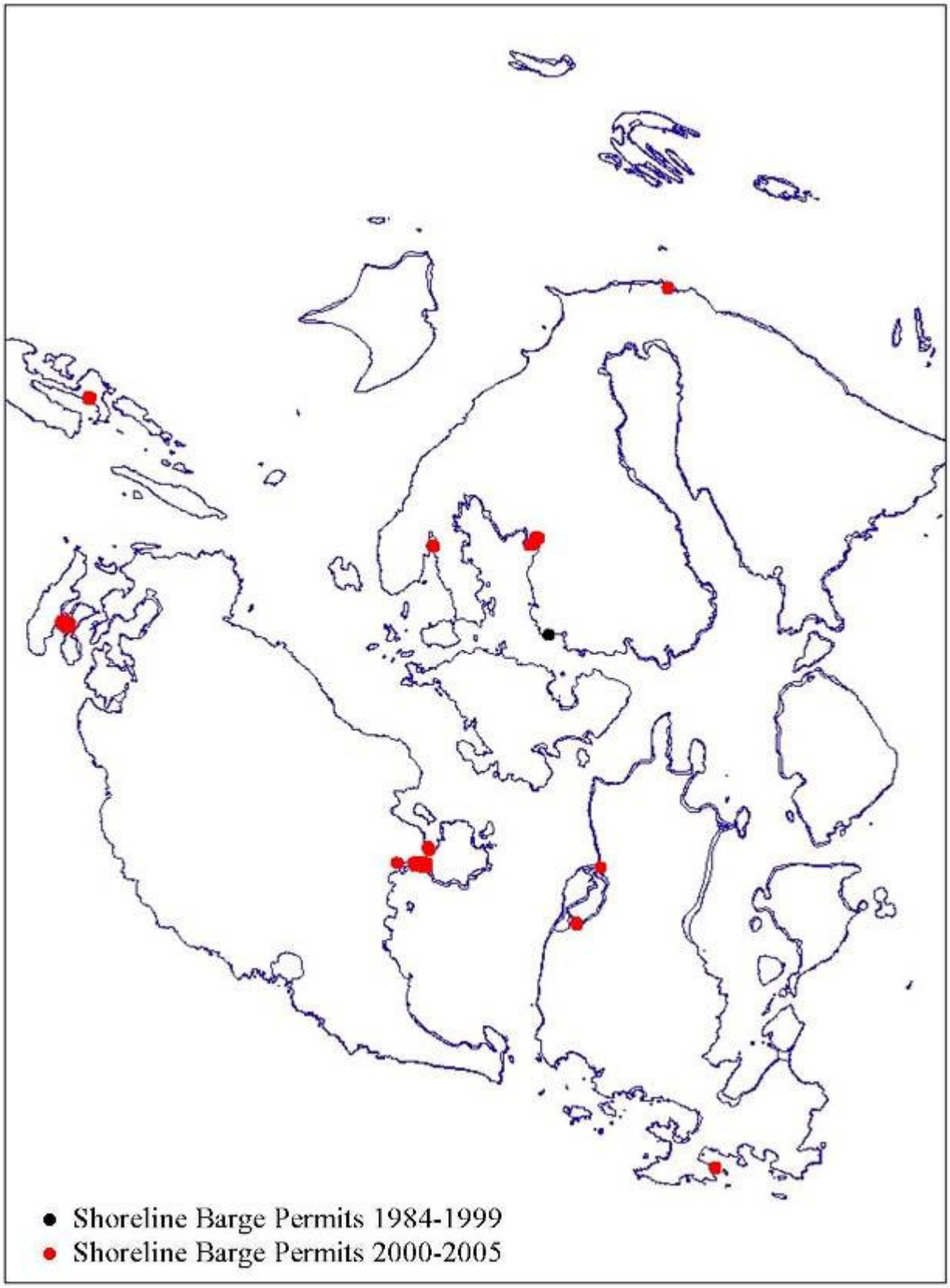
Barge:

San Juan County Code defines a *Barge Landing Site* as "any location established for the purpose of landing a barge (including powered landing craft) for more than a single, temporary use" (SJC UDC 18.2). A total of 31 shoreline permits have been issued in San Juan County for barge landings from 1984 to 2005, with the majority of the activity (87%) occurring between 2000 and 2005. Barge permit activity from 1984 through 1999 involved 4 permits, including 1 substantial development, 1 exemption, 1 violation and 1 undefined. Barge permit activity from 2000-2005 involved 27 permits including 15 code investigations (two sunken barges, 13 illegal barge landings and one un-permitted work on a landing); one provisional permit for temporary use of a landing and 11 exemptions (ten for temporary use and one for landing site repair). The first permit for barge landing was issued in 1984. Barge landing permit activity occurred at an average annual rate of 0.25 from 1984 to 1999, and an annual rate of 4.5 per year from 2000 to 2005. Tax parcel information is available for 11 shoreline barge permits (41%); these are included in the spatially explicit components of this project.

Table 2. Barge Permit Activity

Permit Type	*Barge Permits 1984-1999*	*Barge Permits 2000-2005*	*Total Barge Permits 1984-2005*
Substantial development	1	0	1
Exemption	1	11	12
Violation	1	15	16
Undefined	1	0	1
Provisional	0	1	1
Total barge permits	*4*	*27*	*31*

Barge Landing


Shoreline Barge Permits 1984-1999
Shoreline Barge Permits 2000-2005

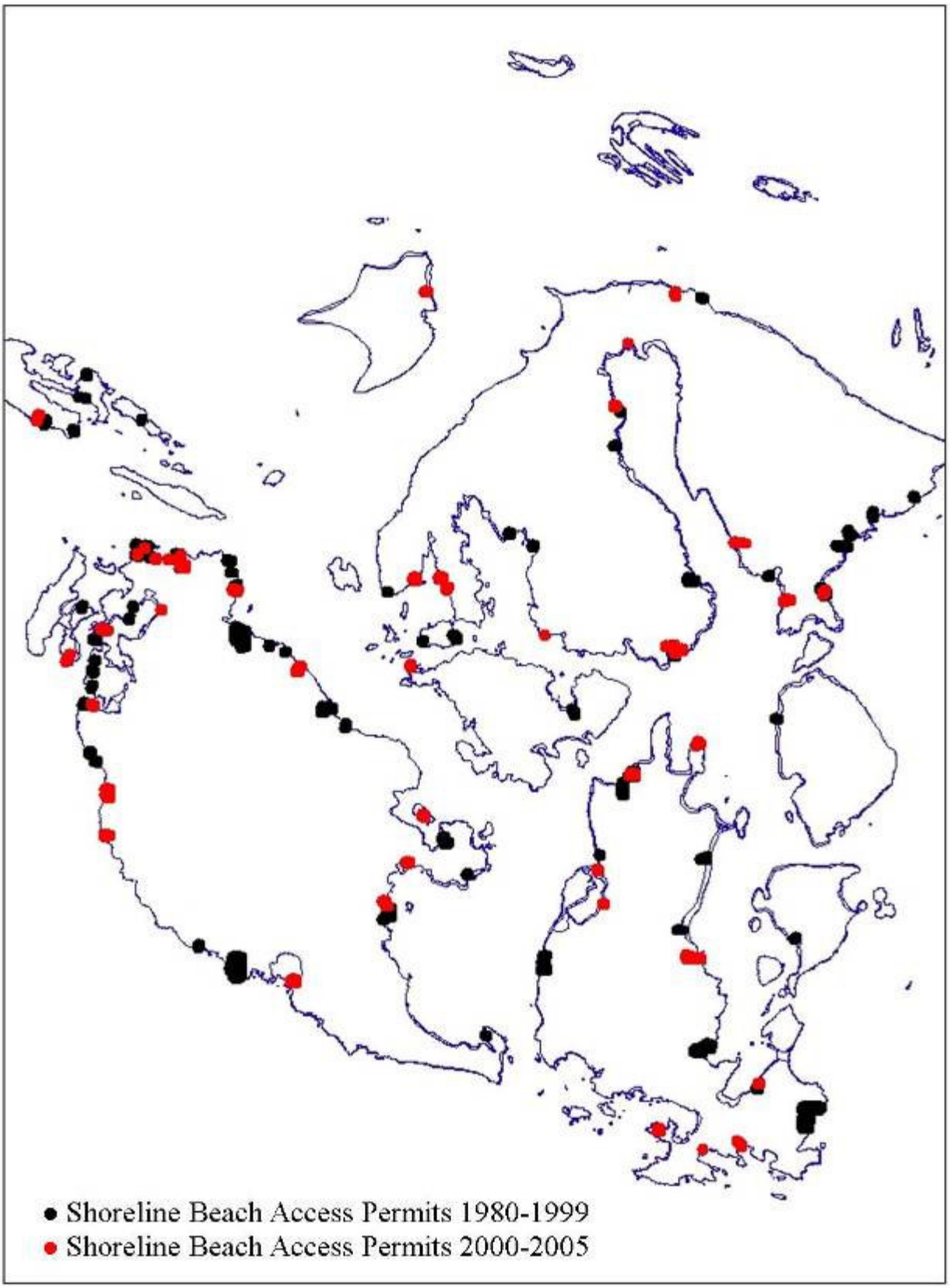
Beach Access:

San Juan County Code does not define *Beach Access*. A total of 203 shoreline permits for Beach Access were issued between 1980 and 2005, representing 7% of developed shoreline parcels. Beach access permit activity from 1980 to 1999 involved 147 permits, including 49 substantial development, 73 exemptions and 22 code violations. Beach access permit activity from 2000 to 2005 involved 56 permits, including one code investigation for vegetation removal; two residential pre-applications; 13 shoreline permits for access structures; two variances for access structures and 40 exemptions for access structures and vegetation removal. Tax parcel information is available for 141 beach access permits (69%); these are included in the spatially explicit components of this project. Beach Access permit activity on shoreline parcels occurred at an annual rate of 4.5 per year from 1980 to 1999, and an annual rate of 7.6 per year from 2000 to 2005.

Table 3. Beach Access Permit Activity

Permit Type	*Beach Access Permits 1980-1999*	*Beach Access Permits 2000-2005*	*Total Beach Access Permits 1980-2005*
Substantial development	49	*13*	62
Exemption	73	40	113
Violation	22	1	23
Variance	0	2	2
Residential Pre Application	0	2	2
Total beach access permits	*147*	*56*	*203*

Beach Access


Shoreline Beach Access Permits 1980-1999
Shoreline Beach Access Permits 2000-2005

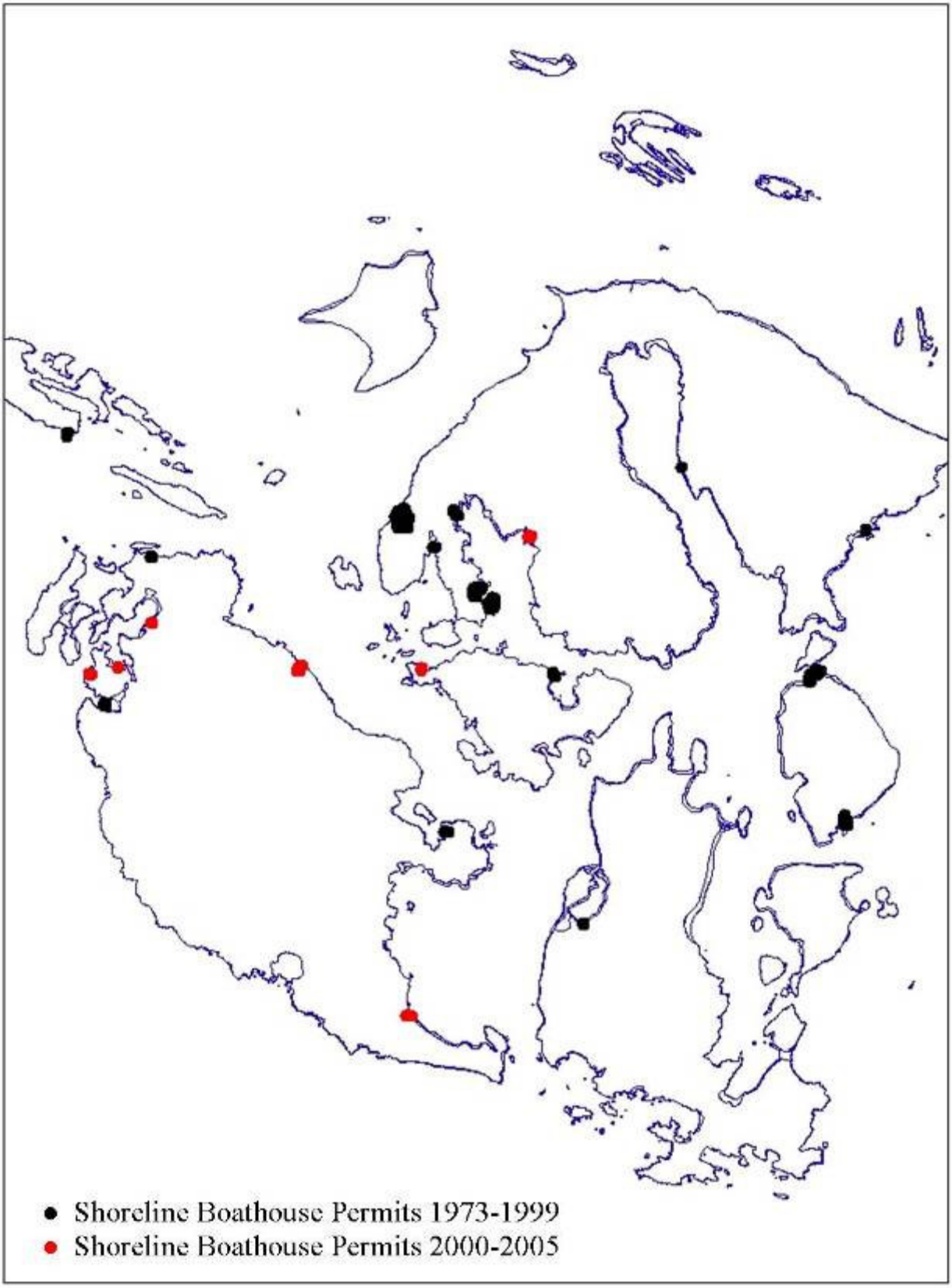
Boathouse:

San Juan County Code defines *Boathouse* as **"**an enclosed structure designed and used for the storage of boats and boat equipment" (SJC UDC 18.2). A total of 42 shoreline permits for boathouses were issued between 1973 and 2005. Boathouse permit activity from 1973 to 1999 involved 32 permits, including 13 substantial developments and 16 exemptions. Boathouse permit activity from 2000 to 2005 involved ten permits including three code investigations for illegal structures; one residential pre application; two shoreline permits for new boathouse structures and five exemptions for structure replacement (2) and repair/modification (3). Tax parcel information is available for 25 boathouse permits (59%); these are included in the spatially explicit components of this project. The annual rate of boathouse permit activity was 0.9 per year from 1973 to 1999 and 1.2 per year for the period 2000 to 2005.

Table 4. Boathouse Permit Activity

Permit Type	*Boathouse Permits 1973-1999*	*Boathouse Permits 2000-2005*	*Total Boathouse Permits 1973-2005*
Substantial development	13	2	15
Exemption	16	5	21
Violation	0	3	3
Residential Pre Application	0	1	1
Total boathouse permits	*32*	*10*	*42*

Boat house


Shoreline Boathouse Permits 1973-1999
Shoreline Boathouse Permits 2000-2005

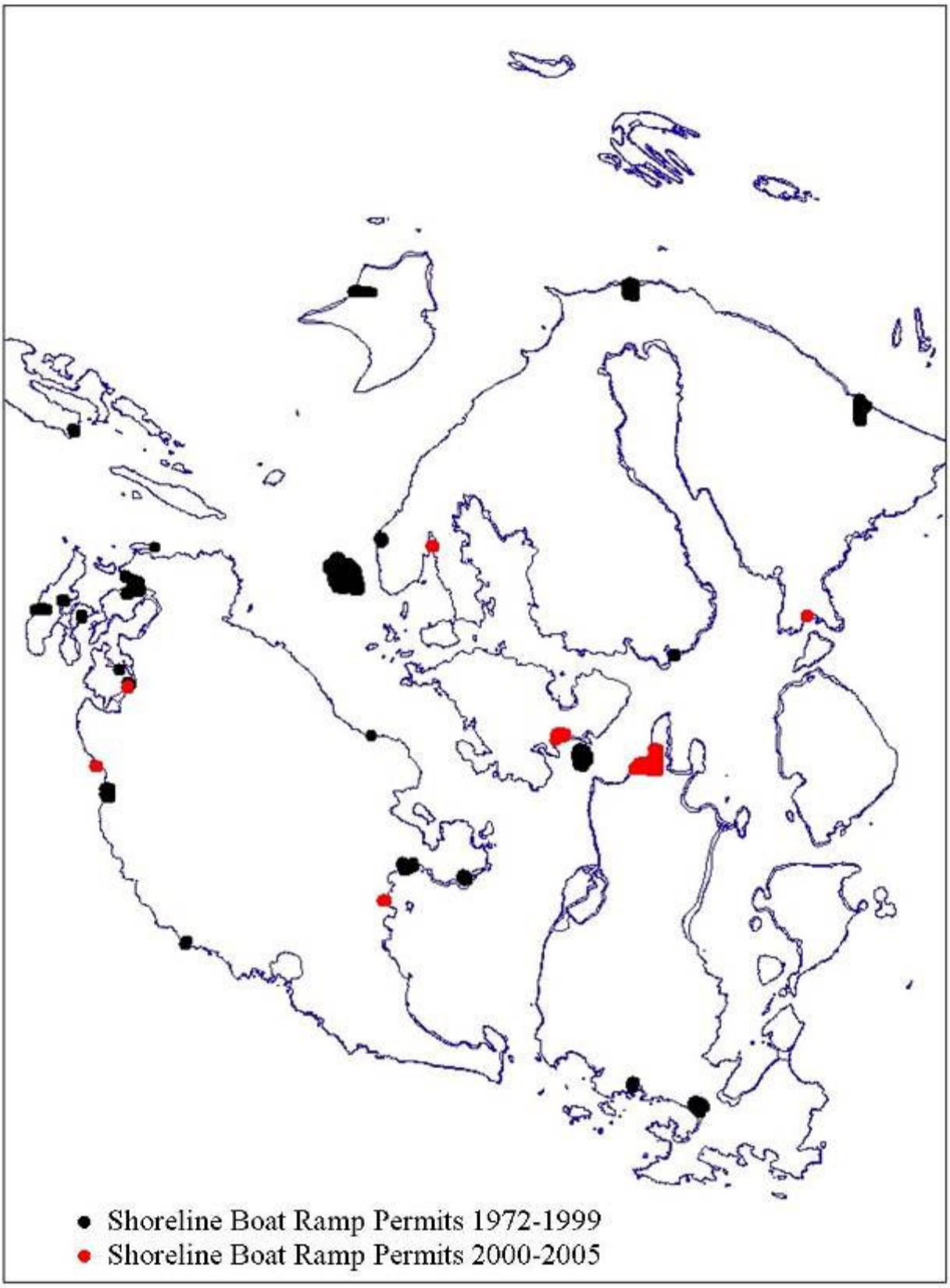
Boat Ramps:

San Juan County Code defines *Boat Ramps* as "Boat launch, ramp or retrieval system means an area, structure, or equipment used to launch or retrieve boats" (SJC UDC 18.2). A total of 47 shoreline permits for boat ramps were permitted in San Juan County between 1972 and 2005. Boat ramp permit activity from 1972 to 1999 involved 38 permits including 13 substantial development permits, 22 exemptions, and three violations. Boat ramp permit activity from 2000 to 2005 involved nine permits including two code investigations (illegal ramp, sunken barge at ramp); three shoreline permits for new boat ramps and four exemptions to replace (2) and repair (2) existing boat ramps. Tax parcel information is available for 33 boat ramp permits (67%); these are included in the spatially explicit components of this project. The annual rate of shoreline boat ramp permit activity was 1.5 per year from 1985 to 1999 and 1.3 per year for the period 2000 to 2005.

Table 5. Boat Ramp Permit Activity

Permit Type	*Boat Ramp Permits 1972-1999*	*Boat Ramp Permits 2000-2005*	*Total Boat Ramp Permits 1972-2005*
Substantial development	13	3	16
Exemption	22	4	26
Violation	3	2	5
Total boat ramp permits	*38*	*9*	*47*

Boat ramp and dock


Shoreline Boat Ramp Permits 1972-1999
Shoreline Boat Ramp Permits 2000-2005

Bulkheads:

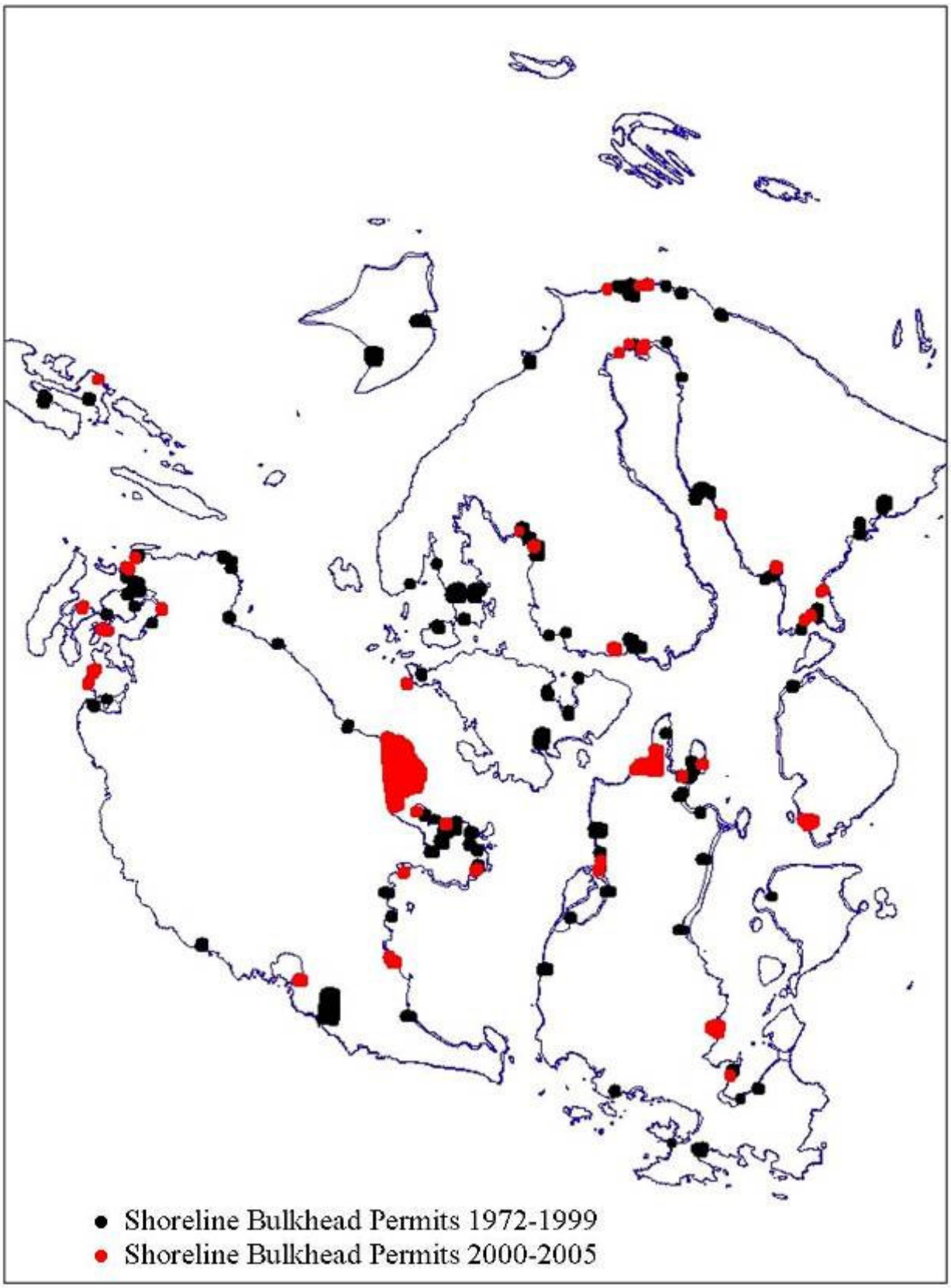
San Juan County Code defines *Bulkheads* as "Bulkheads or seawalls means structures erected parallel to and near the high water mark for the purpose of protecting the adjacent bank or uplands from the action of waves or currents" (Ord. 12–2001§ 3; Ord. 11–2000 § 3; Ord. 2–1998 Exh. B § 2.3) (SJC UDC 18.2). San Juan County plays the primary role in bulkhead project review as bulkheads for single family residences are allowed (subject to county review) by an exemption to the Shoreline Management Act. As exemptions, they are not reviewed by the Washington State Department of Ecology. A total of 318 shoreline permits for bulkheads were issued in San Juan County between 1972 and 2005, representing 9% of developed shoreline parcels. The annual rate of bulkhead permit activity from 1972 to 1999 was 5 per year, and in the period 2000 to 2005 the annual rate of shoreline bulkhead permits was 9 per year.

Bulkhead

The 1972-1999 permit center data records do not distinguish between bulkhead repairs and new bulkhead construction. Total bulkhead permit activity from 1972 to 1999 involved 258 permits, including 38 substantial development, 202 exemptions and 13 code violations. Analysis of the newer permit center database, which includes permits from 2000 to 2005 and categorizes multiple bulkhead project actions, involved 60 permits including 18 permits for new bulkhead construction, 30 for bulkhead repair and 12 for bulkhead violations. Of the 18 permits described as new bulkheads, five were shoreline permits for new bulkheads and 13 were exemptions. Exemptions were described as: bulkhead extension (1), erosion control (2) and new bulkhead structures (10). Bulkhead repair permit activity from 2000 to 2005 includes six shoreline permits and 24 exemptions for repair and replacement work on bulkheads. Bulkhead violation permit activity from 2000-2005 involved 12 violations includes illegal construction (11) and location over a neighboring property line (1). Tax parcel information is available for 205 total bulkhead permits (75%); these are included in the spatially explicit components of this project.

Table 6. Bulkhead Permit Activity

Permit Type	*Bulkhead Permits 1972-1999*	*Bulkhead Permits 2000-2005*	*Bulkhead Permits 1972-2005*
Substantial development	38	11	49
Exemption	202	37	239
Violation	13	12	25
Total bulkhead permits	*258*	*60*	*318*


Shoreline Bulkhead Permits 1972-1999
Shoreline Bulkhead Permits 2000-2005

Clearing and Grading:

San Juan County Code defines *Clearing and Grading* in two separate definitions including: "Clearing means the destruction or removal, by hand or with mechanical means, of vegetative ground cover or trees including, but not limited to, root material or topsoil material. Grading means stripping, cutting, filling, or stockpiling land including the land in its cut or filled condition to create new grade" (SJC UDC 18.2).

Shoreline Clearing

A total of 74 permits for clearing and grading have been issued in San Juan County between 1981 and 2005, 28 of these (38%) were located on shoreline parcels. From 1981 to 1999, 20 of the 39 clearing and grading permits with tax parcel information (51%) were located on shoreline properties. From 2000-2005, the percentage of clearing and grading permits with tax parcel information located on shoreline parcels is 47% (8 of 17 permits with parcel data).

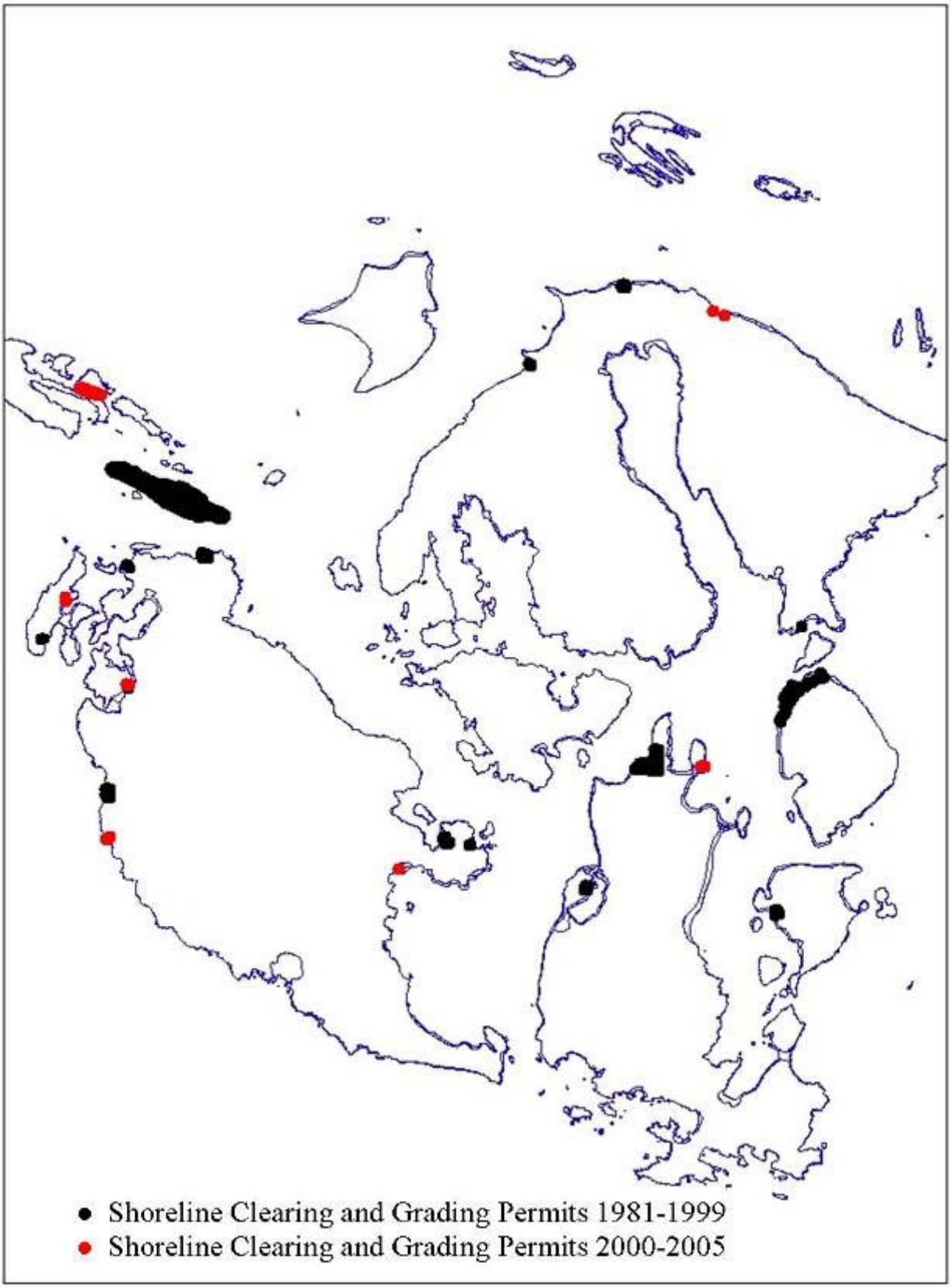
Shoreline clearing and grading permit activity from 1981 to 1999 involved 20 permits, including 4 substantial development, 14 code violations and 2 SPR (old permit database term, undefined). Shoreline clearing and grading permit activity from 2000 to 2005 involved 8 permits, including 1 exemption and 7 code violations. Clearing and grading violations on shoreline parcels represent 75% of the total shoreline clearing and grading permit actions. The annual rate of shoreline clearing and grading permit activity was 1 per year from 1981 to 1999 and 1.3 per year for the period 2000 to 2005.

Tax parcel information is available for 54 clearing and grading permits, 73% of total clearing and grading permit activity. 28 (52%) of clearing and grading permits with parcel information are located on shoreline parcels and are included in the spatially explicit components of this project.

Table 7. Clearing and Grading Permit Activity*

Permit Type	*Clearing and Grading Permits 1981-1999*	*Clearing and Grading Permits 2000-2005*	*Clearing and Grading Permits 1981-2005*
Substantial development	4	0	4
Exemption	0	1	1
Violation	14	7	21
SPR (undefined term from 'old' SJC permit database)	2	0	2
Total clearing and grading permits	*20*	*8*	*28*

* Table includes subset of permit records with parcel data to ensure location on shoreline tax parcels


Shoreline Clearing and Grading Permits 1981-1999
Shoreline Clearing and Grading Permits 2000-2005

Docks:

San Juan County Code defines *Dock* as **"**a structure that abuts the shoreline and is used as a landing or moorage place for commercial and pleasure craft. A dock typically consists of a pier, ramp, and float" (SJC UDC 18.2). A total of 910 shoreline permits have been issued in San Juan County for dock activity between 1972 and 2005, representing 30% of developed shoreline parcels. The average annual rate of dock permit activity is 27.5; with a pre 1999 rate of 28 per year and a 2000-2005 rate of 25 per year, a slight decrease in the annual rate of dock permits issued since 2000.

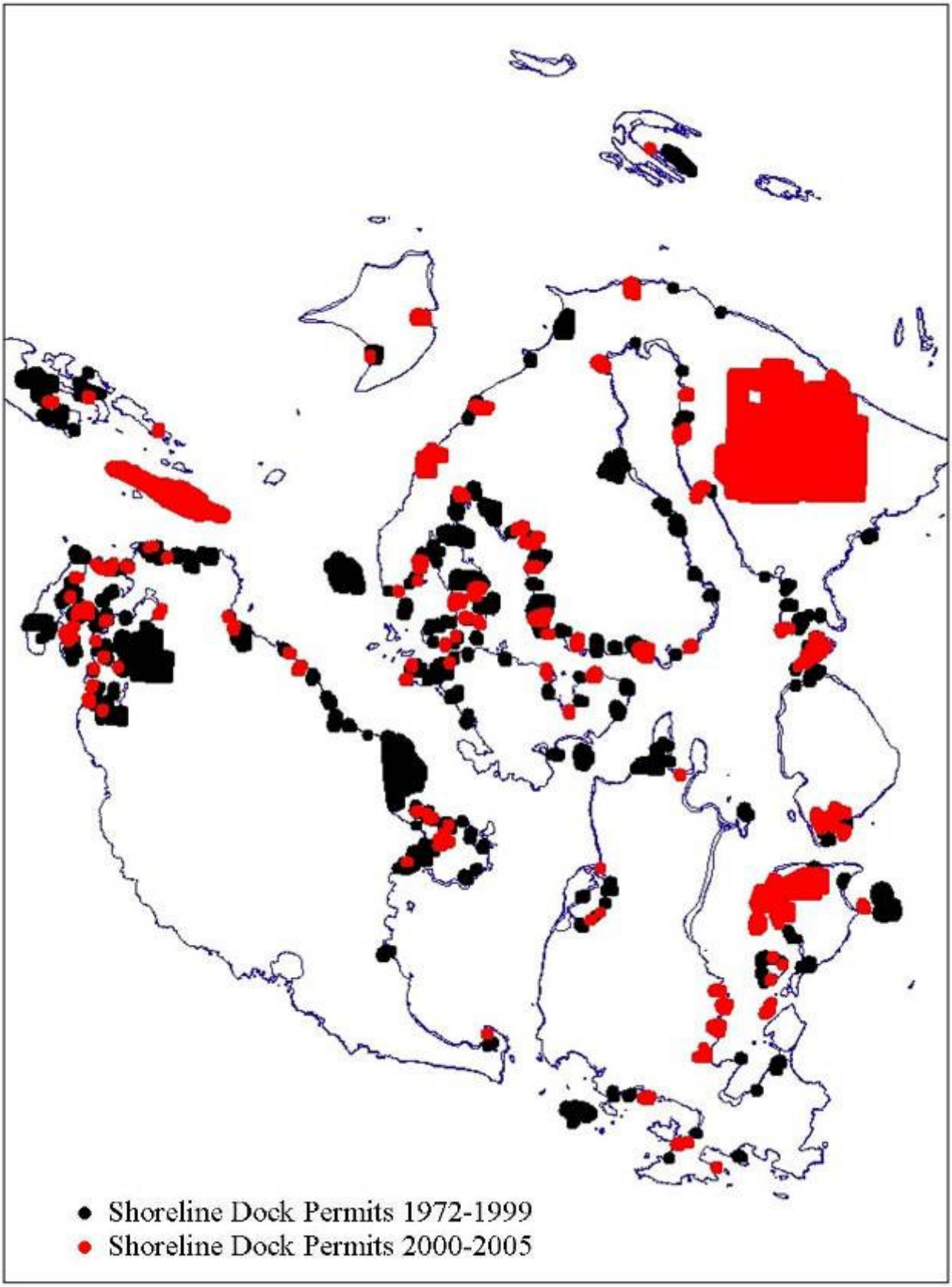
Dock permit activity from 1972 through 1999 involved 760 permits, including 412 substantial development permits, 305 exemptions and 37 code violations. Dock permit activity in San Juan County from 2000 to 2005 involved 150 permits and included: 83 exemptions, 52 shoreline permits, 10 code investigations, 3 variances, 1 revision and 1 residential pre application.

Tax parcel information is available for 505 dock permits, 66% of total dock permits. 484 (96%) of dock permits with parcel information are located on marine shoreline parcels and are included in the spatially explicit components of this project.

Table 8. Dock Permit Activity

Permit Type	*Dock Permits 1972-1999*	*Dock Permits 2000-2005*	*Dock Permits 1972-2005*
Substantial development	412	52	464
Exemption	305	83	388
Violation	37	10	47
Variance	0	3	3
Revision	0	1	1
Residential Pre Application	0	1	1
Undefined	6		6
Total dock permits	*760*	*150*	*910*

Dock


Shoreline Dock Permits 1972-1999
Shoreline Dock Permits 2000-2005

Guesthouse:

San Juan County Code defines a *Guest House* as **"**an accessory dwelling unit that is not rented, but is designed and most commonly used for irregular residential occupancy by family members, guests, and persons providing health care or property maintenance for the owner" (Ord. 21– 2002 § 3; Ord. 12–2002 § 3; Ord. 5–2002 § 2; Ord. 2–1998 Exh. B § 2.3) (SJC UDC 18.2).

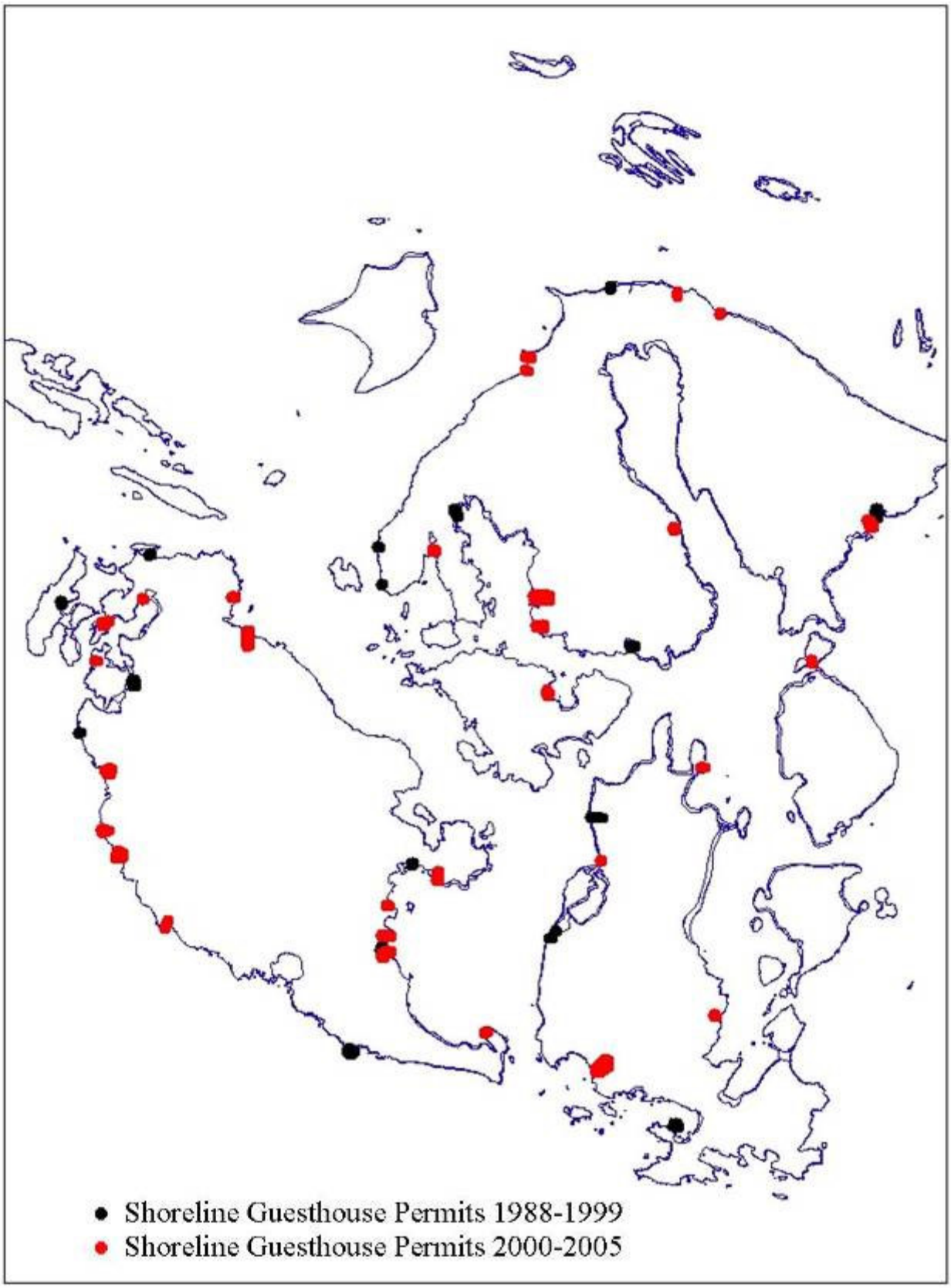
A total of 91 permits were issued for guesthouses in San Juan County from 1988 (the first year this permit category appears in the database) to 2005. Of these, 50 are located on shoreline parcels. The average annual rate of permitting for guesthouses was 3.4 from 1988-1999 and 8.3 per year from 2000 to 2005. The annual rate of guesthouse permits for shoreline parcels was 2.1 from 1992 (first year of shoreline guesthouse in database) to 1999 and 5.5 per year from 2000 to 2005.

Tax parcel information is available for 79 guesthouse permits, 87% of total guesthouse permits. 50 (63%) of guesthouse permits with parcel information are located on shoreline parcels and are included in the spatially explicit components of this project. Permit types for the 50 guesthouse permits known to be on the shoreline include 7 code violations, 1 PA (old database term, undefined), 18 residential pre-applications, 3 variances, 9 substantial development permits, 5 provisional, 5 conditional use and 2 exemptions.

Table 9. Guesthouse Permit Activity*

Permit Type	*Guesthouse Permits 1988-1999*	*Guesthouse Permits 2000-2005*	*Guesthouse Permits 1988-2005*
Substantial development	5	4	9
Exemption	0	2	2
Violation	7	0	7
Residential Pre Application	3	15	18
Provisional	0	5	5
Variance	1	2	3
Conditional Use	0	5	5
PA ('old' SJC permit database term, undefined)	1	0	1
Total guesthouse permits	*17*	*33*	*50*

* Table includes subset of permit records with parcel data to ensure location on shoreline tax parcels


Shoreline Guesthouse Permits 1988-1999
Shoreline Guesthouse Permits 2000-2005

Logging:

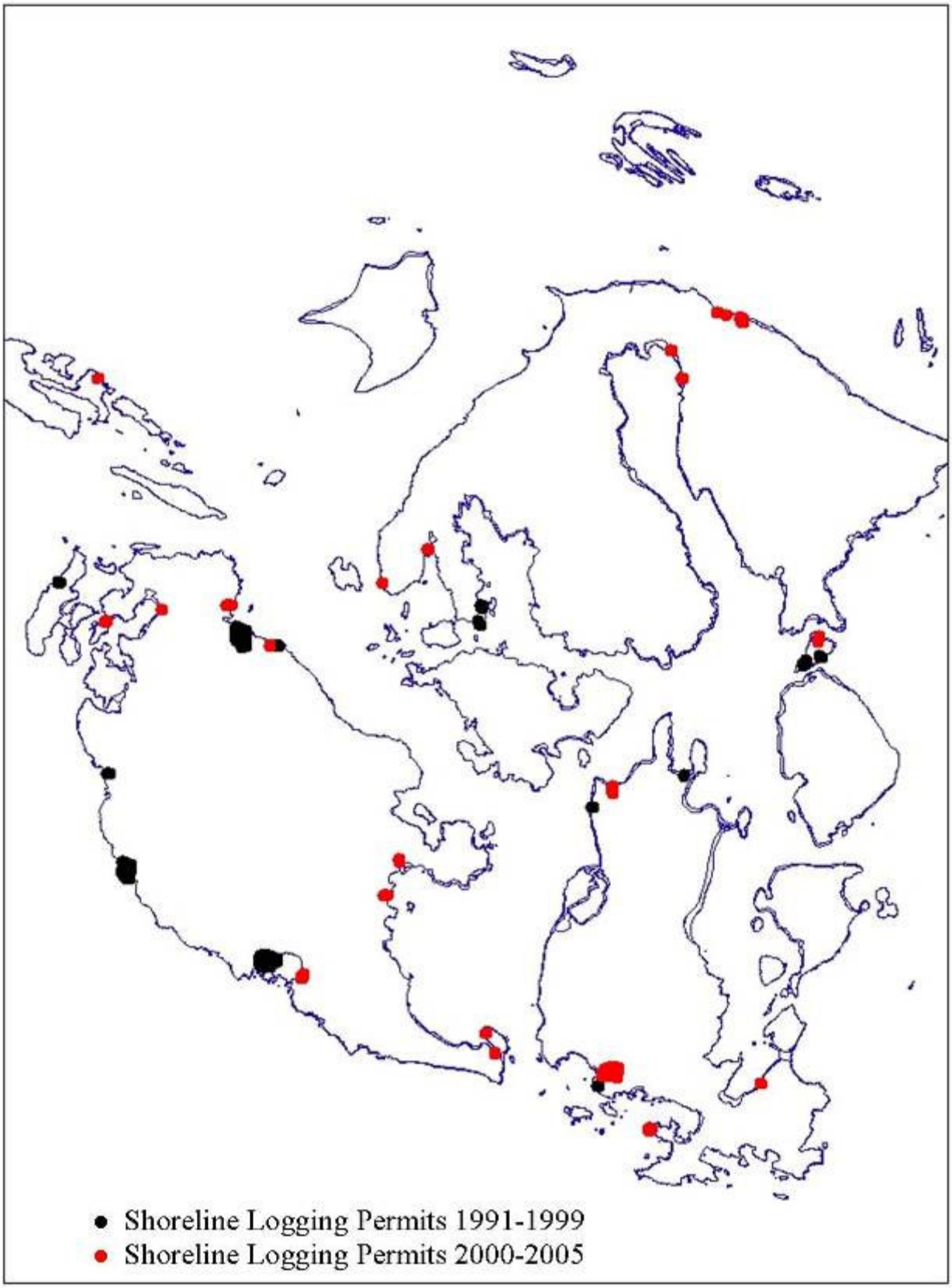
San Juan County Code defines *Logging* as "the harvesting of timber" (SJC UDC 18.2). A total of 72 permits have been issued by San Juan County for logging activities between 1991 and 2005. 35 logging permits (49%) were located on shoreline parcels. The overall rate of logging permits was 3.2 per year for the period 1991 to 1999 and has increased to 7.6 per year for the time period 2000 to 2005. The average annual rate of permits issued for shoreline logging activities has also increased, from 1.4 per year from 1991 to 1999 to 3.6 per year for the period 2000 to 2005.

Tax parcel information is available for 58 logging permits, 80% of total logging permits. 35 (60%) of logging permits with parcel information are located on shoreline parcels and are included in the spatially explicit components of this project. Permit types for the 35 logging permits known to be on the shoreline include 28 code violations, 1 exemption and 6 residential pre applications (all tree removal plans).

Table 10. Logging Permit Activity*

Permit Type	*Logging Permits 1991-1999*	*Logging Permits 2000-2005*	*Logging Permits 1991-2005*
Residential Pre Application	0	6	6
Exemption	0	1	1
Violation	13	15	28
Total logging permits	*13*	*22*	*35*

* Table includes subset of permit records with parcel data to ensure location on shoreline tax parcels

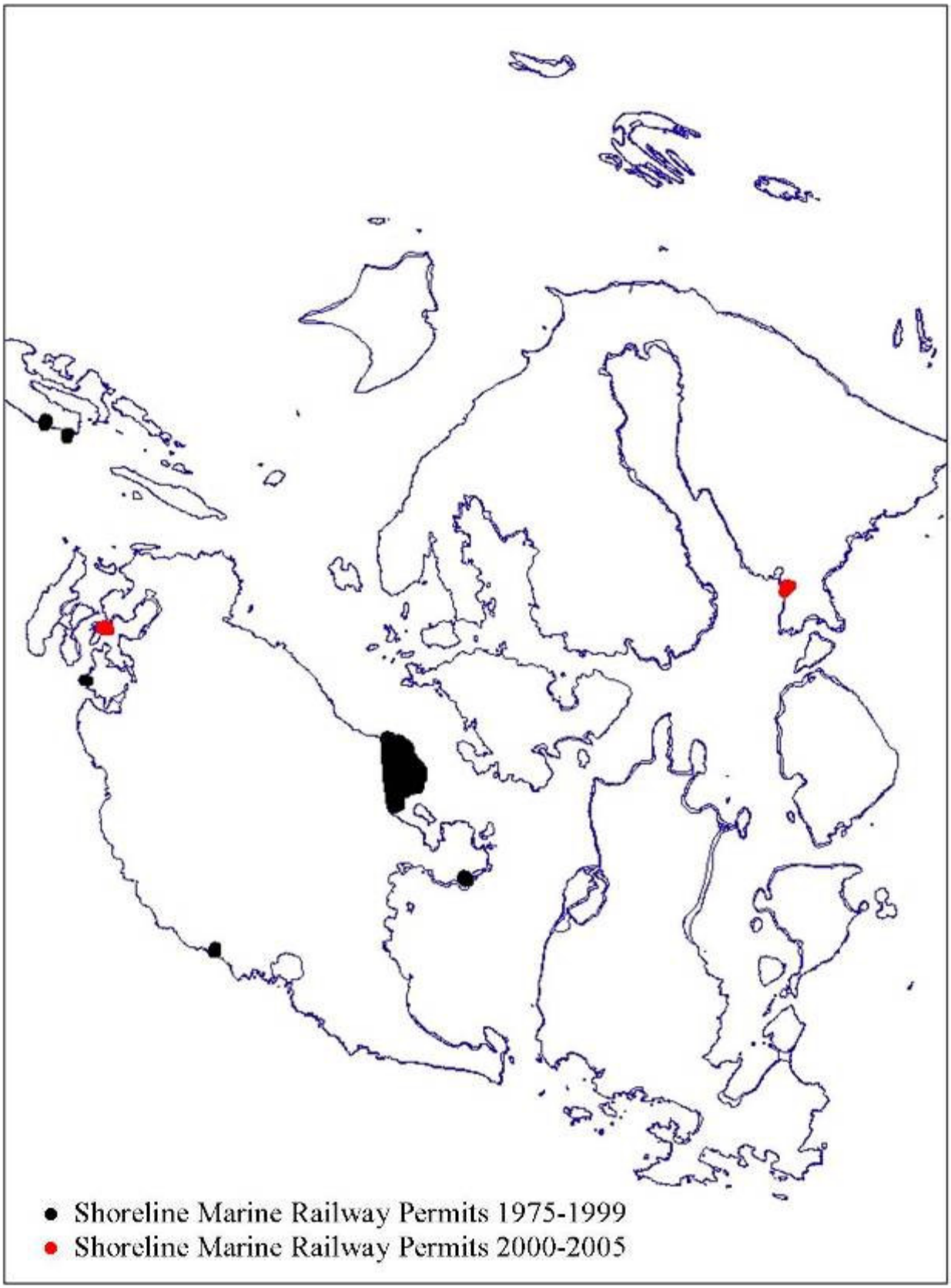

Shoreline Logging Permits 1991-1999
Shoreline Logging Permits 2000-2005

Marine Railway:

San Juan County Code defines *Marine Railway* as "a set of rails running from the upland area into the water upon which a boat can be launched" (SJC UDC 18.2). A total of 8 permits for marine railways have been issued in San Juan County since 1975. Marine railway permit activity from 1975 to 1999 included 1 code violation and 5 substantial development permits. Permit activity from 2000-2005 involved 2 substantial development permits. Tax parcel information is available for all 8 marine railway permits; these are included in the spatially explicit components of this project. The annual rate of marine railway permit activity was 0.3 per year from 1975-1999 and 0.6 per year for the period 2000-2005.

Table 11. Marine Railway Permit Activity

Permit Type	*Marine Railway Permits 1975-1999*	*Marine Railway Permits 2000-2005*	*Marine Railway Permits 1975-2005*
Substantial development	5	2	7
Violation	1	0	1
Total marine railway permits	*6*	*2*	*8*


Shoreline Marine Railway Permits 1975-1999
Shoreline Marine Railway Permits 2000-2005

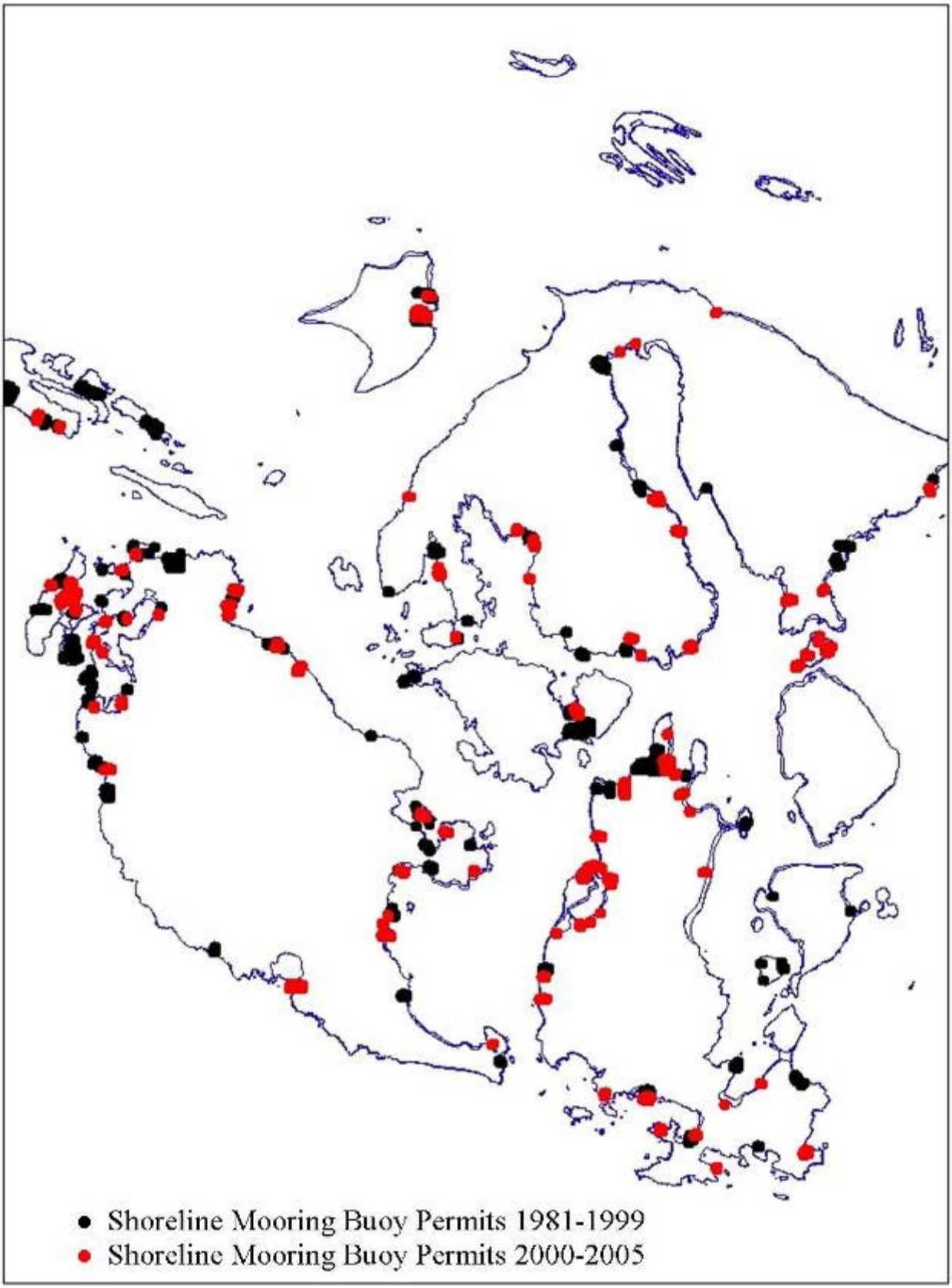
Mooring Buoy:

San Juan County Code defines *Mooring Buoy* as "a buoy secured to the bottom by permanent moorings and provided with means for mooring a vessel by use of its anchor chain or mooring lines" (SJC UDC 18.2). A total of 277 permits have been issued for mooring buoys in San Juan County, 222 (80%) of which were permitted for shoreline parcels. Over 10% of developed shoreline parcels have a permitted buoy. The annual rate of shoreline mooring buoy permit activity was 6.2 per year from 1981-1999 and 17 per year for the period 2000-2005.

Sailboat on Mooring Buoy

Table 12. Mooring Buoy Permit Activity

Permit Type	*Mooring Buoy Permits 1981-1999*	*Mooring Buoy Permits 2000-2005*	*Mooring Buoy Permits 1981-2005*
Substantial development	4	2	6
Violation	5	3	8
Exemption	132	131	263
Total mooring buoy permits	*141*	*136*	*277*


Shoreline Mooring Buoy Permits 1981-1999
Shoreline Mooring Buoy Permits 2000-2005

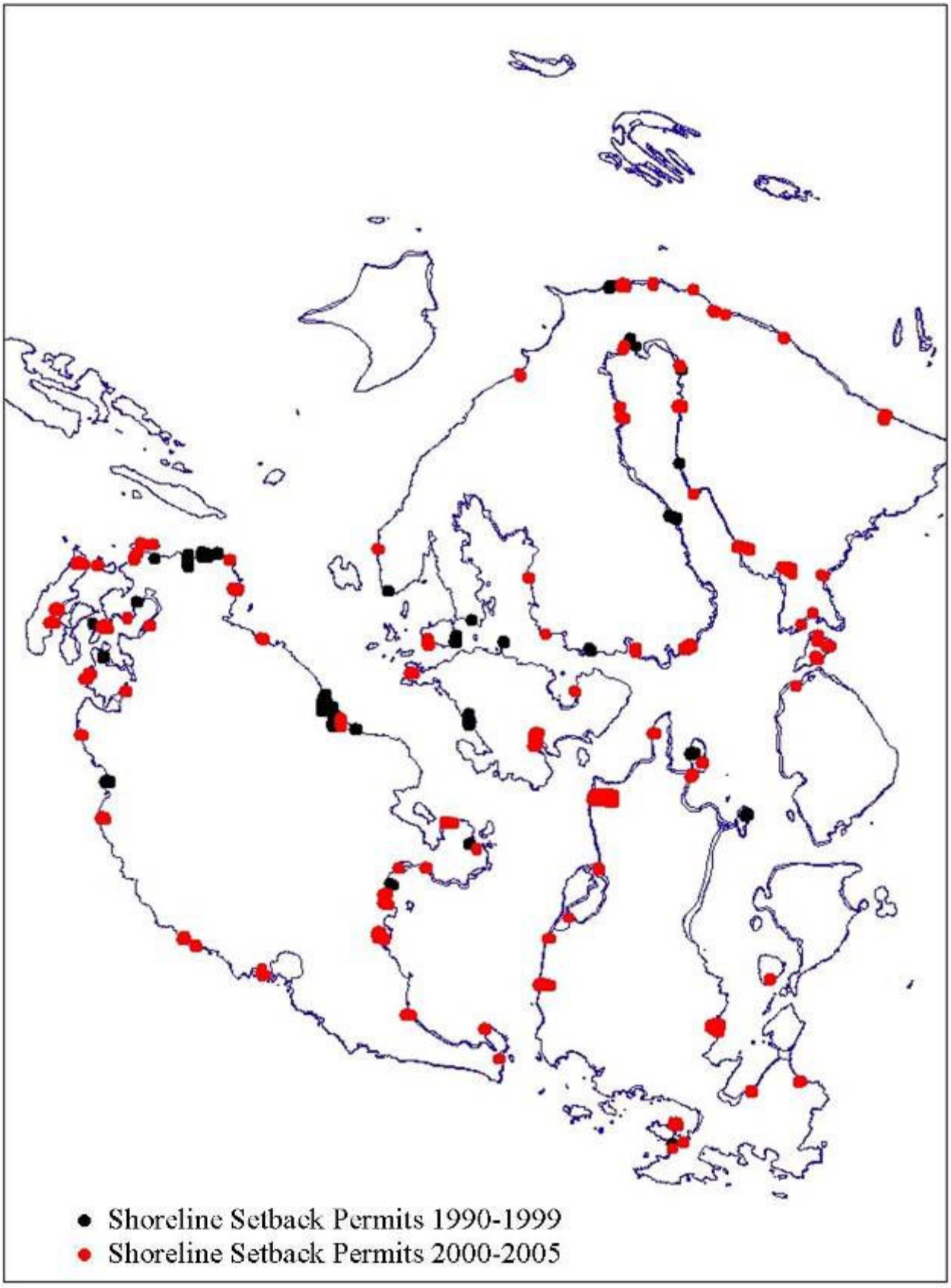
Setback:

San Juan County Code defines *Setback* as **"**the distance a structure is placed behind a specified line or topographic feature" (SJC UDC 18.2). A total of 153 permits have been issued for setback determinations in San Juan County from 1991 to 2005. Tax parcel information is available for 144 (94%) of total setback permits. Of the 144 setback permits with tax parcel information, 131 (91%) are located on shoreline properties and are included in the spatially explicit components of this project. Permit type for the 131 shoreline setback permits include 99 residential pre applications, 18 variances and 14 code violations. The annual rate of shoreline setback permit activity was 3.4 per year from 1990-1999 and 16 per year for the period 2000-2005.

Table 13. Setback Permit Activity*

Permit Type	*Setback Permits 1991-1999*	*Setback Permits 2000-2005*	*Setback Permits 1991-2005*
Residential Pre Application	23	76	99
Variance	5	13	18
Violation	6	8	14
Total setback permits	*34*	*97*	*131*

* Table includes subset of permit records with parcel data to ensure location on shoreline tax parcels


Shoreline Setback Permits 1990-1999
Shoreline Setback Permits 2000-2005

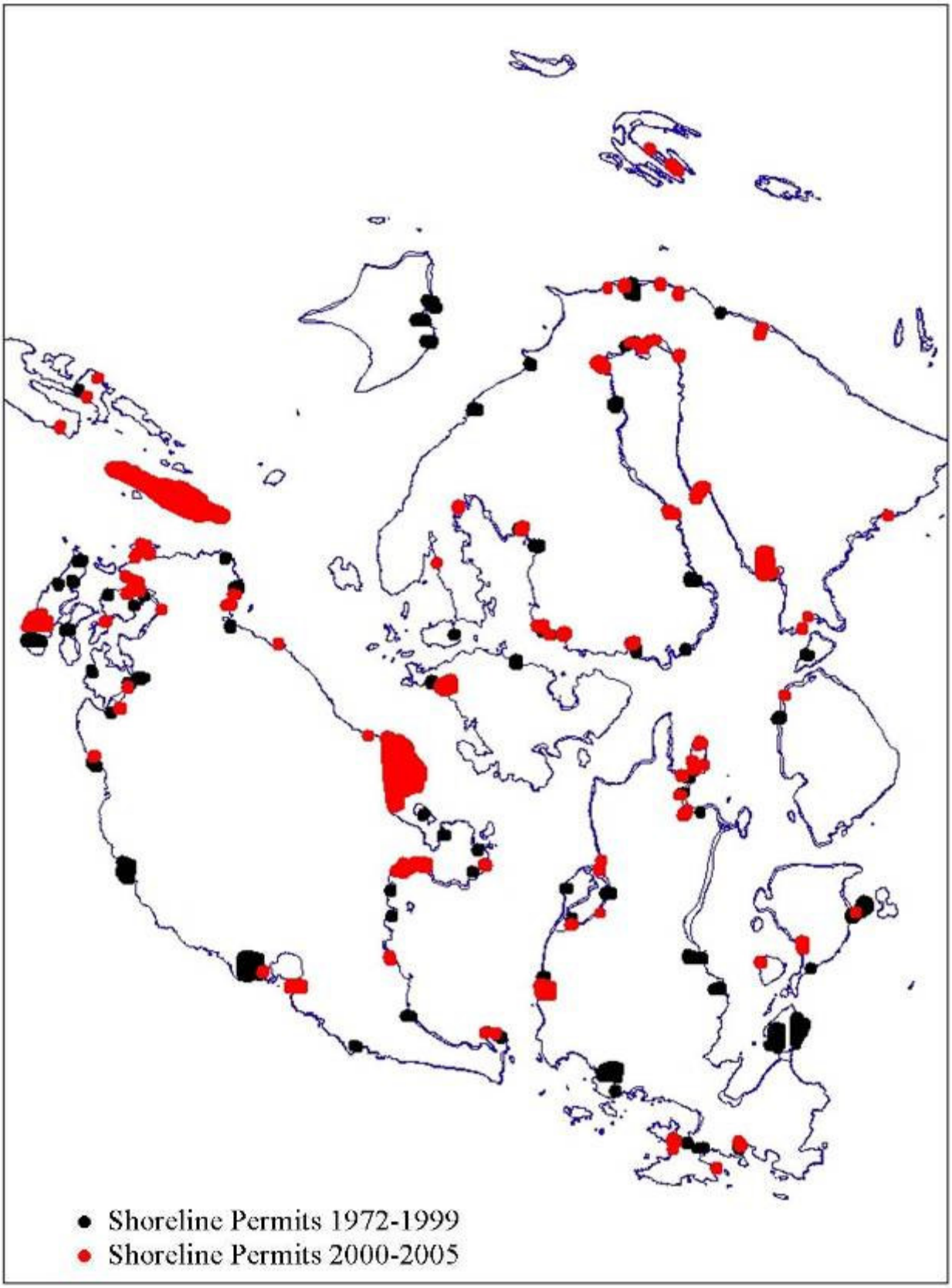
Shoreline:

San Juan County Code defines *Shoreline development* as **"**a use consisting of the construction or exterior alteration of structures; dredging; drilling; dumping; filling; removal of any sand, gravel, or minerals; bulkheading; driving of piling; placing of obstructions; or any project of permanent or temporary nature which interferes with the normal public use of the surface of the waters overlying lands subject to Chapter 90.58 RCW at any stage of water level" (RCW 90.58.030; WAC 173–27– 030) (SJC UDC 18.2).

A total of 177 permits have been issued for the category *shoreline* in San Juan County. Review of permit descriptions indicate that the majority of shoreline permits were for activities associated with building and/or tree removal associated with residential shoreline development. Four percent of developed shoreline parcels have shoreline permits. Shoreline permit activity from 1972 to 1999 involved 82 permits, including 71 code violations, 1 PA, 4 RPAs, 2 substantial development permits and 4 exemptions. Shoreline permit activity from 2000-2005 involved 95 permits including 18 residential pre application (6 -expansion, 7- new construction, 2- structure replacement); 4 shoreline permits (1 after the fact permit, 2 permits for second shoreline residences and 1 for a wood fence); 5 exemptions (1 each for storage structures, deer fence, tide gate modification, roof repair and waterfront improvement) and 68 violations. A total of 68 shoreline permit category violations were issued between 2000 and 2005, an average annual rate of 11 violations per year. Of the 68 shoreline violations issued from 2000-2005, over one third (27) were not sufficiently described to assign a project type. Of the remaining 41 with better descriptions, violation activity types included: illegal work in the shoreline (18); illegal building/structures in the shoreline (16); illegal digging in the shoreline (5); illegal tree cutting in the shoreline (2); illegal decks in the shoreline (2); illegal fill in the shoreline (1); horses (1); and illegal shoreline fence (1). The annual rate of shoreline permit activity was 4 per year from 1980-1999 and 15 per year for the period 2000-2005.

Table 14. Shoreline Permit Activity

Permit Type	*Shoreline Permits 1972-1999*	*Shoreline Permits 2000-2005*	*Shoreline Permits 1972-2005*
Substantial development	2	4	6
Violation	71	68	139
PA (undefined term from 'old' SJC permit database)	1	0	1
Residential Pre Application	4	18	22
Exemption	4	5	9
Total shoreline permits	*82*	*95*	*177*


Shoreline Permits 1972-1999
Shoreline Permits 2000-2005

Stormwater:

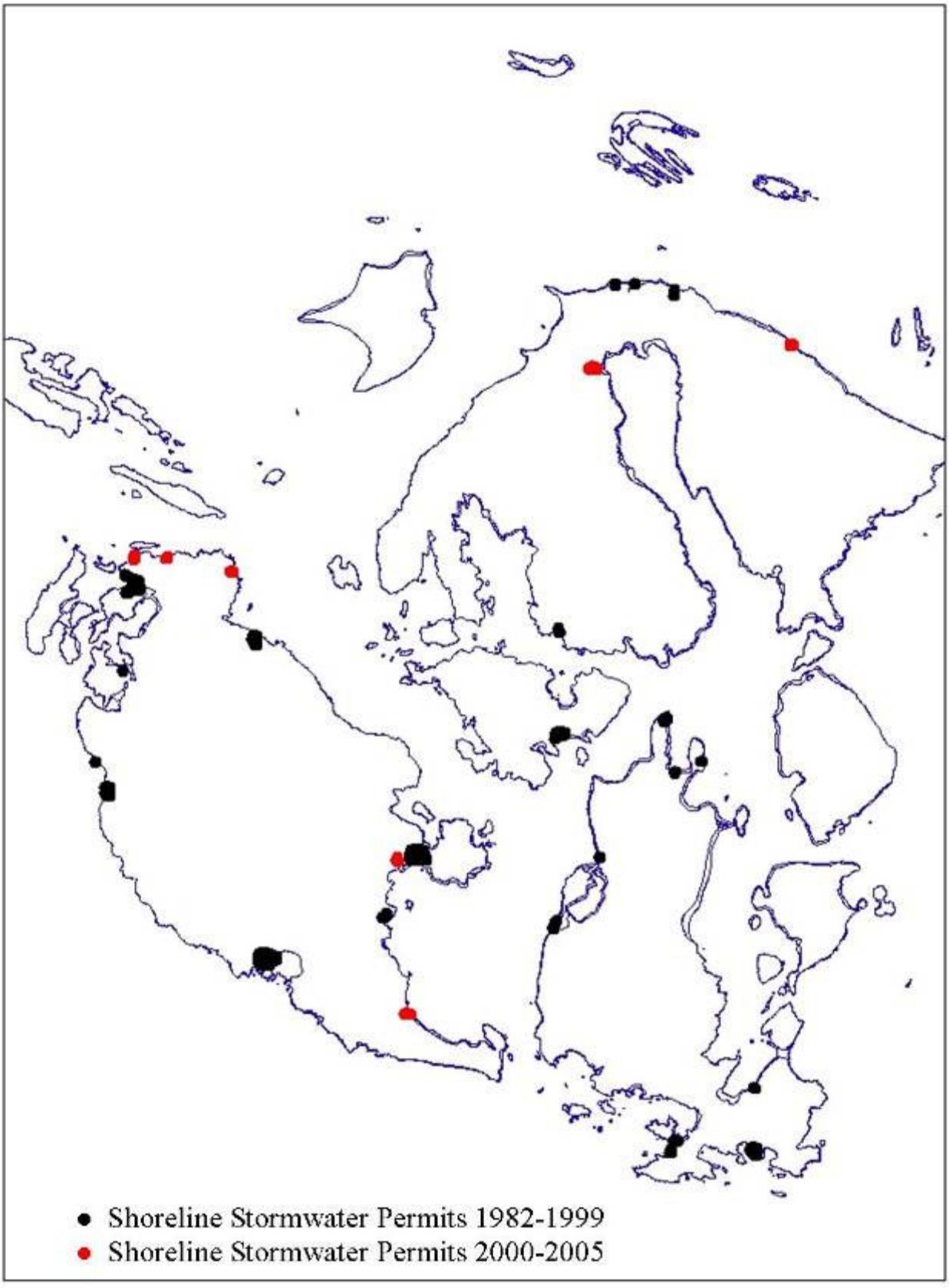
Stormwater is not defined in San Juan County Code**.** A total of 73 permits were issued for stormwater in San Juan County from 1982 to 2005. Tax parcel information is available for 49 stormwater permits, 67% of total stormwater permits. 33 stormwater permits with parcel information are located on shoreline parcels (67%) and are included in the spatially explicit components of this project. Permit types for the 33 stormwater permits known to be on the shoreline include 5 code violations, 1 conditional use, 3 substantial development permits and 24 exemptions. The annual rate of shoreline stormwater permit activity was 1.7 per year from 1986-1999 and 1.5 per year for the period 2000-2005.

Table 15. Stormwater Permit Activity*

Permit Type	*Stormwater Permits 1982-1999*	*Stormwater Permits 2000-2005*	*Stormwater Permits 1982-2005*
Exemption	21	3	24
Substantial development	1	2	3
Conditional Use	1	0	1
Violation	1	4	5
Total stormwater permits	*24*	*9*	*33*

* Table includes subset of permit records with parcel data to ensure location on shoreline tax parcels

Stormwater Outfall


Shoreline Stormwater Permits 1982-1999
Shoreline Stormwater Permits 2000-2005

Transient Rental:

San Juan County Code defines *Transient Accommodations* as "a commercial or residential use involving the rental of any structure or portion thereof for the purpose of providing lodging for periods less than 30 days" (SJC UDC 18.2).

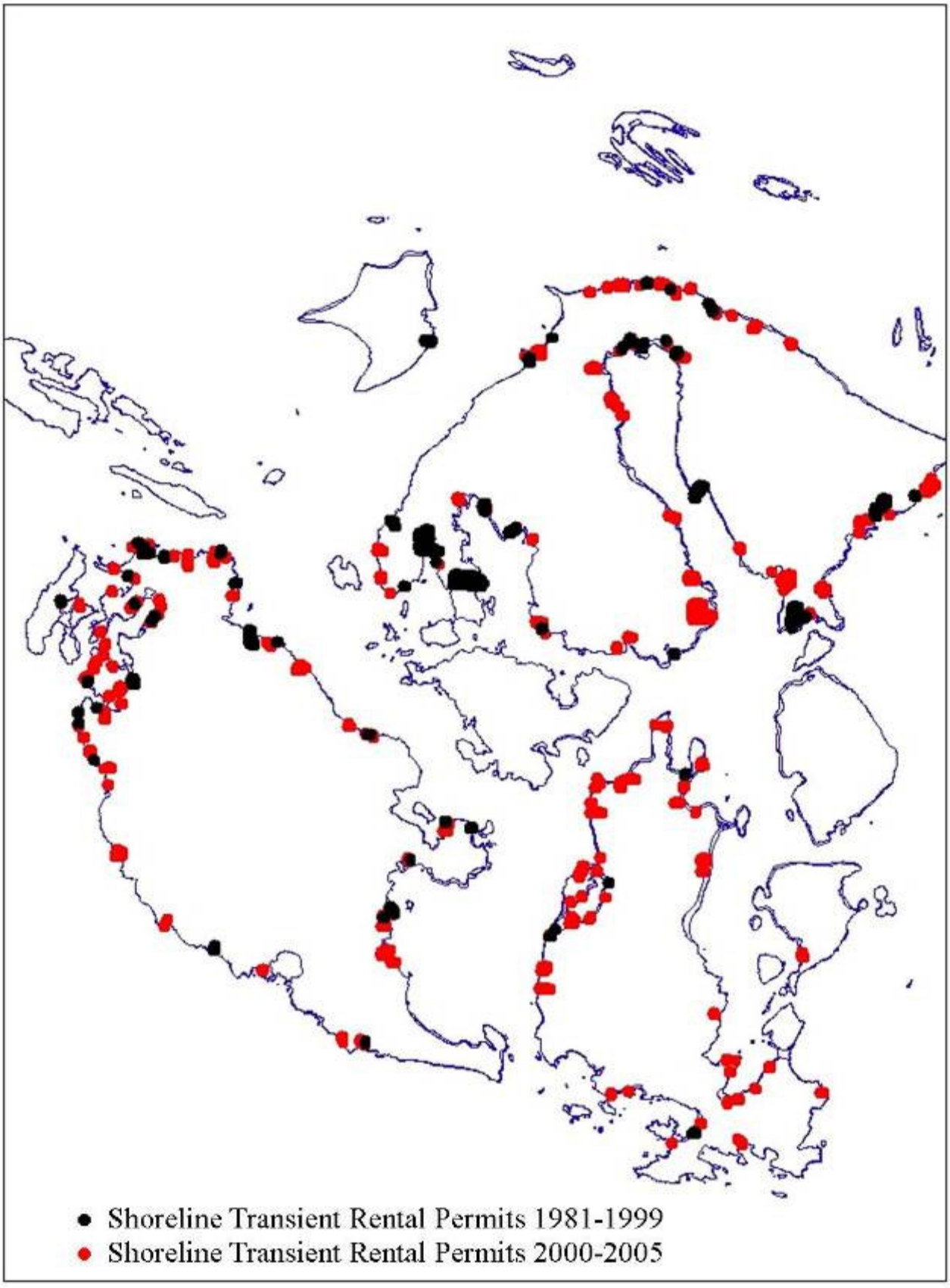
A total of 708 transient rental permits have been issued in San Juan County from 1978 to 2005. There has been a large increase in annual rate of transient rental permit activity over time, with large spikes in the years 1999 (n=155) and 2000 (n=145). The annual rate of overall transient rental activity is 13.4 per year for the period 1978 through 1999 and is 68.8 per year for the period 2000-2005. Transient rental permit rates for shoreline properties have also increased, from an annual rate of four per year from 1981-1999 to an annual rate of 30 per year from 2000 to 2005.

Tax parcel information is available for 584 transient rental permits, 82% of total transient rental permits. 289 (49%) of transient rental permits with parcel information are located on shoreline parcels and are included in the spatially explicit components of this project. Permit types for the 289 transient rental permits known to be on the shoreline include 30 code violations, 78 conditional use, 1 residential pre application, 28 substantial development, 41 site plan review, 109 provisional, and 2 exemptions.

Table 16. Transient Rental Permit Activity*

Permit Type	*Transient Rental Permits 1978-1999*	*Transient Rental Permits 2000-2005*	*Transient Rental Permits 1978-2005*
Substantial Development	16	12	28
Residential Pre Application	1	0	1
Exemption	2	0	2
Conditional Use	15	63	78
Violation	24	6	30
Site Plan Review	18	23	41
Provisional	0	107	107
Total transient rental permits	*76*	*213*	*289*

* Table includes subset of permit records with parcel data to ensure location on shoreline tax parcels

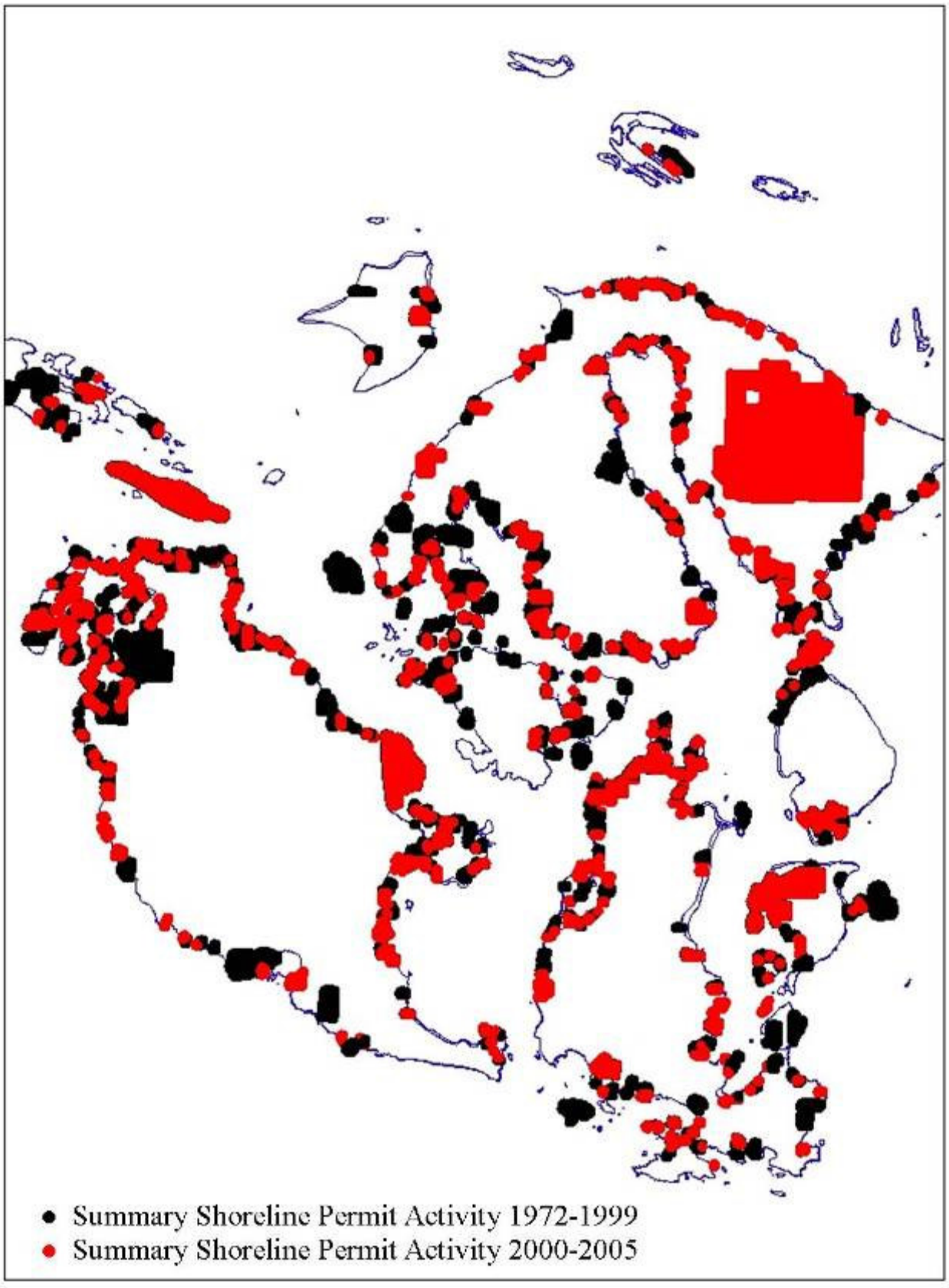

Shoreline Transient Rental Permits 1981-1999
Shoreline Transient Rental Permits 2000-2005

Summary Shoreline Permit Activity by Project Type:

Total shoreline permit activity with tax parcel data for shoreline parcels for the categories included above (aquaculture, barge, beach access, boat house, boat ramp, bulkhead, clearing and grading, dock, guesthouse, logging, marine railway, mooring buoy, setback, shoreline, stormwater and transient rental included 2,607 permits, an annual rate of 77 permits per year. Of these 1,642 occurred between 1972 and 1999, an annual rate of 59 permits and 927 occurred from 2000-2005, an annual rate of 155 permits.

Table 17. Summary Shoreline Land Use Permit Activity by Project Type

Project Type	'old' land use permit database 1972-1999	'new' land use permit database 2000-2005	Total permit activity on shoreline parcels 1972-2005
Aquaculture	28	0	28
Barge	4	27	31
Beach Access	147	56	203
Boathouse	32	10	42
Boat Ramp	38	9	47
Bulkhead	258	60	318
Clearing and Grading	20	8	28
Docks	760	150	910
Guesthouse	17	33	50
Logging	13	22	35
Marine Railway	6	2	8
Mooring Buoys	141	136	277
Setback	34	97	131
Shoreline	82	95	177
Stormwater	24	9	33
Transient Rental	76	213	289
Total	*1,642 (59 per year)*	*927 (155 per year)*	*2607 (77 per year)*


Summary Shoreline Permit Activity 1972-1999
Summary Shoreline Permit Activity 2000-2005

Shoreline Permit Analysis by Permit Type

Exemptions:

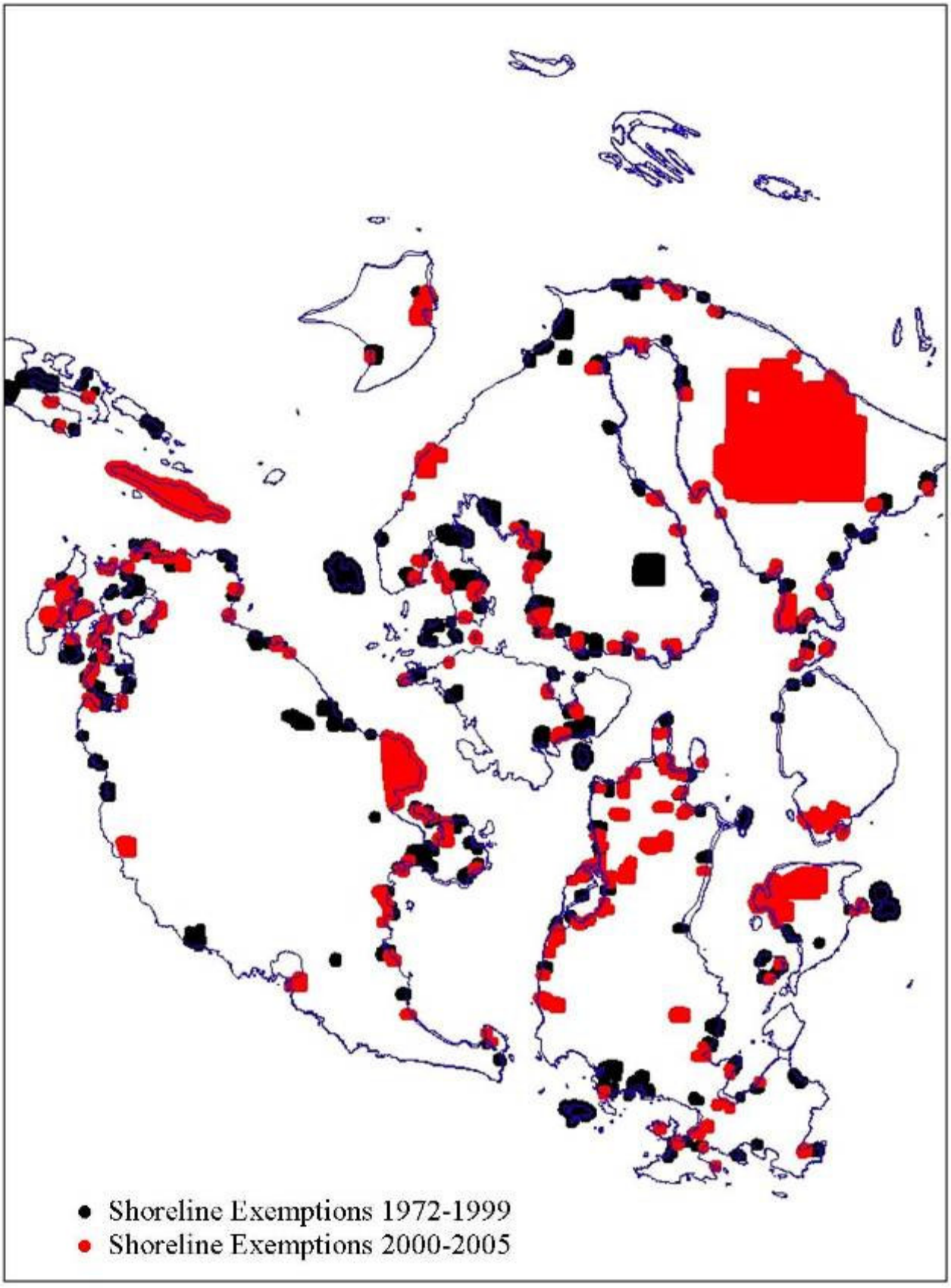
San Juan County Code defines *Shoreline Exemptions* as "Shoreline substantial development permit exemption means certain developments that meet the precise terms of listed exemptions and are granted exemption from the requirements of the substantial development permit process of the Shoreline Management Act (SMA). An activity that is exempt from the substantial development provisions of the SMA must still be carried out in compliance with policies and standards of the Act and the Master Program (Element 3 of the Plan and Chapter 18.50 SJCC). Shoreline conditional use or variance permits may also still be required even though the activity does not need a substantial development permit" (*Cf.* RCW 90.58.030(3) (e); WAC 173–27–030(7) and 173–27–040) (SJC UDC 18.2).

43% of land use permits included in the *San Juan County Shoreline Permit Analysis* are exemptions. From 1972 through 1999, 794 shoreline exemptions were granted for the following project activity types included in this analysis: aquaculture (16), barge (1), beach access (73), boathouse (16), boat ramp (22), bulkhead (202), docks (305), mooring buoy (132), shoreline (4) and stormwater (21) and transient rental (2) a rate of 28 per year. The majority of shoreline exemptions from 1972-1999 were in four project types: docks (39% of exemptions), bulkheads (26% of exemptions), mooring buoys (14% of exemptions) and beach access (9% of exemptions).

Between 2000 and 2005, 323 shoreline exemptions were granted for the same project activity types, barge (11), beach access (40), boathouse (5), boat ramp (4), bulkhead (37), clearing and grading (1), docks (83), guesthouse (2), logging (1) mooring buoy (131), shoreline (5) and stormwater (3) a rate of 49 shoreline exemption permits per year. The majority of shoreline exemptions from 2000-2005 were in four project types: mooring buoy (34% of exemptions), docks (29% of exemptions), beach access (14% of exemptions) and bulkheads (13% of exemptions).

Table 18. Exemption Permit Activity on Shoreline Parcels

Project Activity Type	Exemptions 1972-1999 # (annual rate)	Exemptions 2000-2005 # (annual rate)
Aquaculture	16	0
Barge	1	11
Beach Access	73	40
Boathouse	16	5
Boat Ramp	22	4
Bulkhead	202	37
Clearing and Grading	0	1
Docks	305	83
Guesthouse	0	2
Logging	0	1
Marine Railway	0	0
Mooring Buoys	132	131
Shoreline	4	5
Stormwater	21	3
Transient Rental	2	0
Total Exemptions # (annual rate)	*794 (28 per year)*	*323 (54 per year)*


Shoreline Exemptions 1972-1999
Shoreline Exemptions 2000-2005

Substantial Development Permit Activity:

26% of land use permits included in the *San Juan County Shoreline Permit Analysis* are substantial developments. From 1972 to 1999, of total of 574 substantial development permits on shoreline parcels were recorded in the following project categories: aquaculture (11) barge (1), beach access (49), boathouse (13), boat ramp (13), bulkhead (38), clearing and grading (4), docks (412), guesthouse (5), marine railway (5), mooring buoy (4), shoreline (2), stormwater (1) and transient rental (16), an annual rate of 20 permits. Total substantial development permit activity on shoreline properties for these project types from 2000-2005 involved 107 permits, including beach access (13), boathouse (2), boat ramp (3), bulkhead (11), docks (52), guesthouse (4), marine railway (2), mooring buoy (2), shoreline (4), stormwater (2) and transient rental (12), an annual rate of 18 shoreline substantial development permits. The most common shoreline project activity in the permit type category of substantial development permits are docks, representing 71% of substantial shoreline permit activity from 1972-1999 and 48% of substantial shoreline permit activity from 2000 to 2005.

Table 19. Substantial Development Permit Activity on Shoreline Parcels

Project Activity Type	Substantial Development 1972-1999 # of permits	Substantial Development 2000-2005 # of permits
Aquaculture	11	0
Barge	1	0
Beach Access	49	13
Boathouse	13	2
Boat Ramp	13	3
Bulkhead	38	11
Clearing and Grading	4	0
Docks	412	52
Guesthouse	5	4
Logging	0	0
Marine Railway	5	2
Mooring Buoy	4	2
Setback	0	0
Shoreline	2	4
Stormwater	1	2
Transient Rental	16	12
Total Substantial Development # (annual rate)	*574 (20 per year)*	*107 (18 per year)*

Code Violation Permit Activity:

San Juan County Code does not define *Violation*. 14% of land use permits included in the *San Juan County Shoreline Permit Analysis* are violations. From 1972 to 1999, of total of 217 code violation investigations on shoreline parcels were recorded in the following project categories: barge (1), beach access (22), boat ramp (3), bulkhead (13), clearing and grading (14), docks (37), guesthouse (7), logging (13), marine railway (1), mooring buoy (4), setback (6), shoreline violation (71), stormwater (1) and transient rental (24), an annual rate of 8 land use violations on shoreline tax parcels per year. The majority of shoreline code violations from 1972-1999 were related to the following project types: shoreline (33% of violations), docks (17% of code violations), and beach access (10% of code violations).

Review of the County Permit Database descriptions indicates that most *shoreline* violations are associated with residential shoreline development and include activities such as tree removal and building placement. While shoreline clearing and grading and shoreline logging make up a smaller percentage of total shoreline code violations (6%), it is important to note that violations make up the majority of permit activity in these categories. 70% of shoreline clearing and grading permit activities from 1972 to 1999 were code violations and 100% of shoreline logging permit activities from 1972 to 1999 were code violations.

Total code violation investigations on shoreline properties for these same project types from 2000-2005 involved 159 permit actions, including barge (15), beach access (1), boat house (3), boat ramp (2), bulkhead (21), clearing and grading (7), docks (10), logging (15), mooring buoy (3), setback (8), shoreline violation (64), stormwater (4) and transient rental (6), an annual rate of 26 violations. The majority of shoreline code violations from 2000-2005 were related to the following project types: shoreline (40%), bulkheads (13% of violations), barge (15% of violations) and shoreline logging (9%). Review of the County Permit Database descriptions indicates that virtually all *shoreline* violations are associated with residential shoreline development and include activities such as tree removal and building placement.

While shoreline clearing and grading and shoreline logging make up a smaller percentage of total shoreline code violations than some other project types, it is important to note that violations make up the majority of permit activity in these categories. 75% of all clearing and grading permit activities on shoreline parcels from 2000 to 2005 were code violations and 80% of logging permit activities on shoreline parcels from 2000 to 2005 were code violations.

Table 20. Violation Permit Activity on Shoreline Parcels

Project Activity Type	Violations 1972-1999 # permits	Violations 2000-2005 # permits
Aquaculture	0	0
Barge	1	15
Beach Access	22	1
Boathouse	0	3
Boat Ramp	3	2
Bulkhead	13	12
Clearing and Grading	14	7
Docks	37	10
Guesthouse	7	0
Logging	13	15
Marine Railway	1	0
Mooring Buoy	5	3
Setback	6	8
Shoreline	71	68
Stormwater	1	4
Transient Rental	24	6
Total Violations # (annual rate)	*218 (8 per year)*	*154 (26 per year)*

Building Permits:

Spatially explicit information on residential building permit activity was only available from 1992-2005. For this analysis, residential building permit activity for shoreline parcels only, for the period 1992-2005 was included. Building permit activity in this analysis includes a summary of all project types (garage, new residence, shop, addition, etc.) as the county records are not currently searchable by more specific types of permit activity than *Building*. From 1992 to 1999 residential building permit activity on shoreline parcels involved 816 permits, an annual rate of 102 permits per year. 930 permits were issued for residential building activities on shoreline parcels from 2000-2005, an annual rate of 155 permits.

Shoreline Project Activity as a Percent of Shoreline Building Permit Activity:

Project activity as percent of shoreline building permit activity was determined for the time period with spatially explicit building permit data (ensuring only shoreline building permit activity was included), 1992 to 2005. The analysis was split into two groups, 1992-1999 and 2000-2005 to match the 'old' and 'new' county land use permit databases and also fit with available building permit data with parcel number information so location on marine shorelines is known. Total shoreline project activity as a percentage of building permit activity from 1992-2005 is 90% (1,565 shoreline land use, 1,746 shoreline building).

1992-1999:

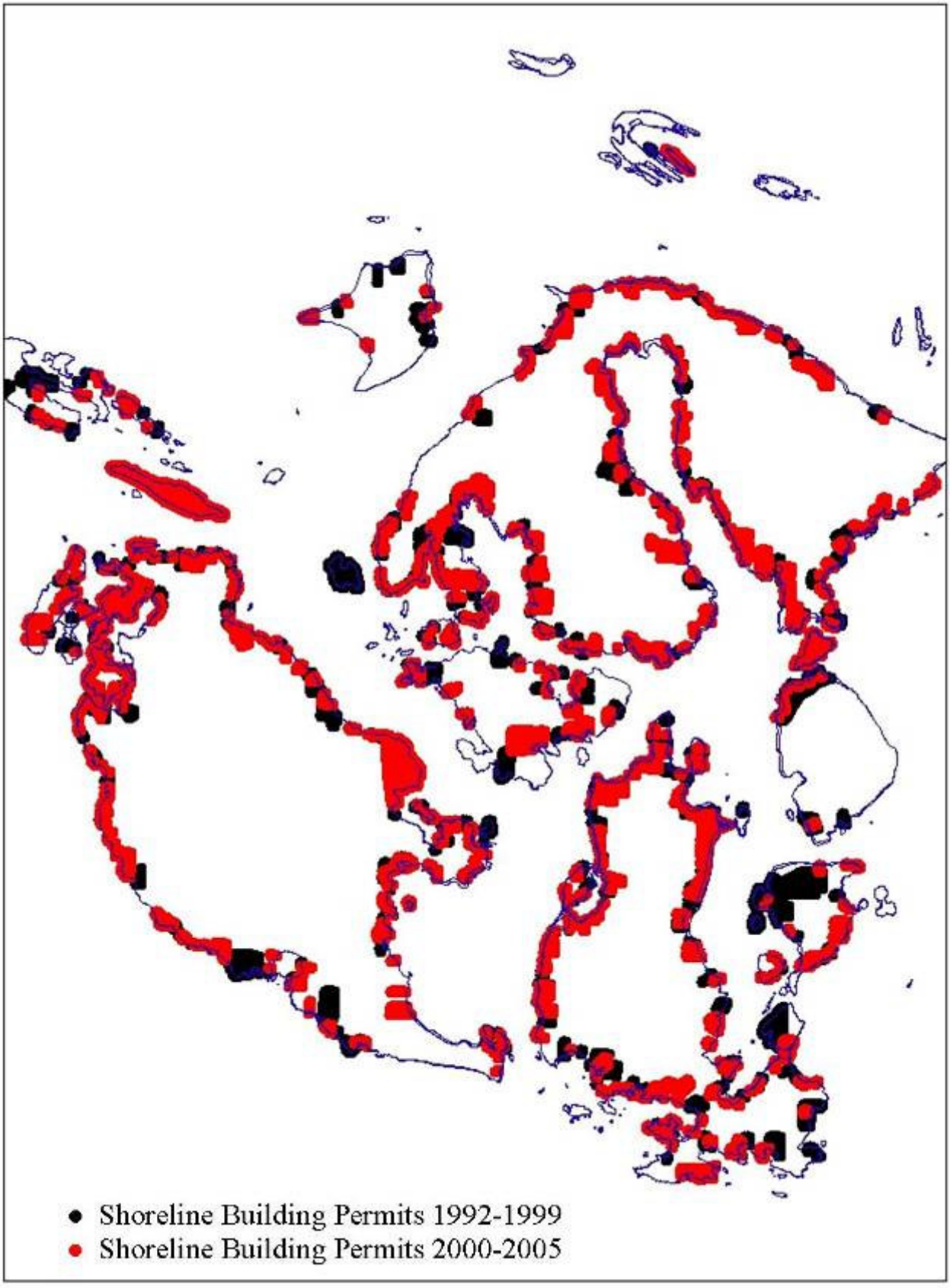
Total shoreline project permit activity 1992-1999 as a percentage of shoreline building permit activity is 78% (638/816) including: 2 Aquaculture; 66 beach access, 7 boathouse, 13 boat ramp, 72 bulkhead, 18 clearing and grading, 183 dock, 17 guesthouse, 11 logging, 5 marine railway, 63 mooring buoy, 32 setback, 79 shoreline, 9 stormwater and 61 transient rental.

2000-2005:

Total shoreline project permit activity 2000-2005 as a percentage of shoreline building permit activity is 99% (927/930) including: 27 barge, 56 beach access, 10 boathouse, 9 boat ramp, 60 bulkhead, 8 clearing and grading, 150 dock, 33 guesthouse, 22 logging, 2 marine railway, 136 mooring buoy, 97 setback, 95 shoreline, 9 stormwater and 213 transient rental.

Table 21. Shoreline Project Permit and Shoreline Building Permit Activity

	# of Permits 1992-1999	# of Permits 2000-2005
Shoreline Project Permit Activity	638	927
Shoreline Building Permit Activity	816	930
Shoreline Project Permit Activity as a Percentage of Shoreline Building Permit Activity	*78%*	*99%*


Shoreline Building Permits 1992-1999
Shoreline Building Permits 2000-2005

Policy Analysis of Shoreline Permit Activity

County Policy and Shoreline Development:

The number and rates of shoreline development were analyzed by shoreline permit/project activity type for the following time periods linked to major changes in policy: Pre Shoreline Master Program (1973-1976); Shoreline Master Program to Interim Environmentally Sensitive Areas Policies (1977-1992); Interim Environmentally Sensitive Areas Policies to Comprehensive Plan (1993-1998); and Updated Comprehensive Plan (1999-2005). Permit activity types included in the policy analysis included: aquaculture, barge, beach access, boathouse, boat ramp, bulkhead, clearing and grading, dock, guesthouse, logging, marine railway, mooring buoy, setback, shoreline, stormwater and transient rental. Analysis of county policy in relation to major policy changes was conducted with the subset of the permits in the county database with tax parcel information to ensure location on marine shorelines. Because of this, the numbers represent a subset of total permit activity. Shoreline building permit activity was not included in the policy analyses, as spatially explicit data is only available for part of 1992 through 2005 for building permits.

Summary of Permit Activity

Pre Shoreline Master Program (1973-1976):
8 permits with tax parcel information indicating location on marine shoreline parcels were recorded from 1973 to 1976, including: 5 dock permits, 2 bulkheads and 1 marine railway. Shoreline permit activity from 1973-1976 occurred at an annual rate of 2 permits per year, excluding building permit activity.

Shoreline Master Program to Interim Environmentally Sensitive Areas Policies (1977-1992):
489 permits with tax parcel information indicating location on marine shoreline parcels were recorded from 1977-1992, including: 5 aquaculture, 1 barge, 40 beach access, 11 boathouse, 13 boat ramp, 73 bulkhead, 6 clearing and grading, 218 docks, 2 guesthouse, 3 logging, 3 marine railway, 62 mooring buoys, 9 setback, 6 shoreline, 18 stormwater and 19 transient rental. Shoreline permit activity from 1977-1992 occurred at an annual rate of 31 permits per year, excluding building permit activity.

Interim Environmentally Sensitive Areas Policies to Comprehensive Plan (1993-1998):
459 permits with tax parcel information indicating location on marine shoreline parcels were recorded from 1993-1998, including: 2 aquaculture, 47 beach access, 5 boathouse, 10 boat ramp, 62 bulkhead, 14 clearing and grading, 131 docks, 12 guesthouses, 9 logging, 2 marine railways, 53 mooring buoys, 22 setback, 65 shoreline, 6 stormwater and 19 transient rental. Shoreline permit activity from 1993-1998 occurred at an annual rate of 77 permits per year, excluding building permit activity.

Updated Comprehensive Plan (1999-2005):
1,012 permits with tax parcel information indicating location on marine shoreline parcels were recorded from 1999-2005, including: 27 barge, 59 beach access, 11 boathouse, 9 boat ramp, 64 bulkhead 8 clearing and grading, 167 docks, 36 guesthouse, 23 logging, 2 marine railway, 140 mooring buoys, 100 setback, 106 shoreline, 9 stormwater and 251 transient rental. Shoreline

permit activity from 1999-2005 occurred at an annual rate of 145 permits per year, excluding building permits.

Table 22. Shoreline Permit Activity and County Policy

Shoreline Project Permits	Pre-Shoreline Master Program 1972-1976	Shoreline Master Program 1977-1992	Interim Environmentally Sensitive Areas 1993-1998	Comprehensive Plan 1999-2005
Aquaculture		5	2	0
Barge		1	0	27
Beach Access		40	47	59
Boathouse		11	5	11
Boat Ramp		13	10	9
Bulkhead	2	73	62	64
Clearing and Grading		6	14	8
Docks	5	218	131	167
Guesthouse		2	12	36
Logging		3	9	23
Marine Railway	1	3	2	2
Mooring Buoys		62	53	140
Setback		9	22	100
Shoreline		6	65	106
Stormwater		18	6	9
Transient Rental		19	19	251
Total permits (total annual rate)	*8 (2 per year)*	*489 (31 per year)*	*459 (77 per year)*	*1,012 (145 per year)*

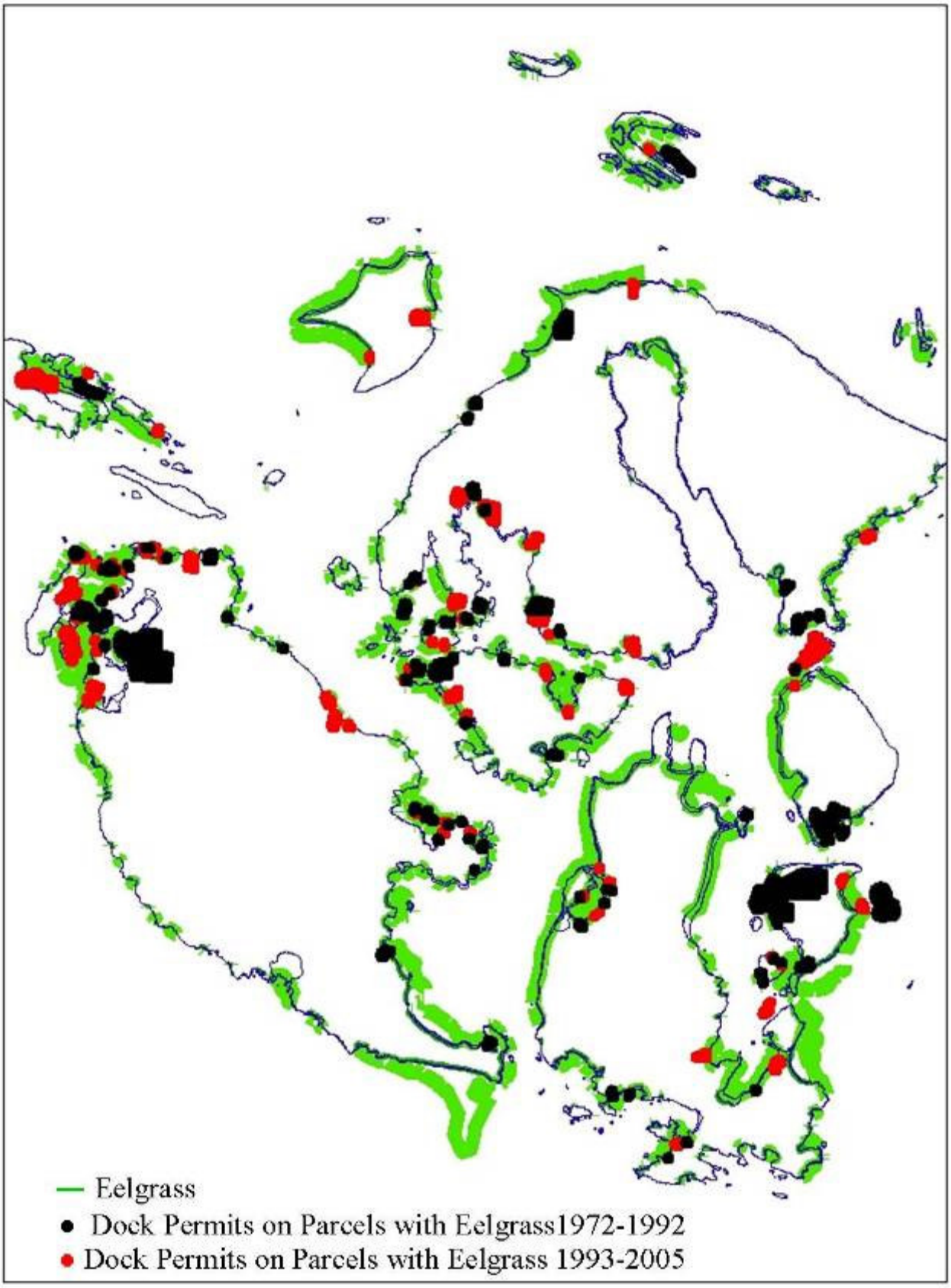
Docks and Eelgrass:

The number, rate and location of total dock permit/project activity and permit activity on parcels with eelgrass present was determined for two time periods, 1973-1992 and 1993-2005, the periods before and after the adoption of eelgrass protection as a *marine habitat area* under the Environmentally Sensitive Areas section of San Juan County Code and the associated county permitting requirement to submit an eelgrass survey with permit application materials. Because of the limitations in searching descriptive fields within the permit database, dock permit activity analysis is a summary of all dock activity types, including dock repairs, violations and expansions, as well as new dock construction. In addition, detailed review of individual permit applications would be required to determine the rate of dock activity occurring directly over eelgrass. Tax parcels with eelgrass within 100 feet were used to define *parcels with eelgrass present*. Project results indicate broad trends and provide a basis for designing future, more detailed analysis into the relationship between dock permit activity and eelgrass protection.

Analysis of the shoreline permit database indicates that from 1972 to 1992, 530 dock permits were issued in San Juan County, an annual rate of 25 per year. From 1993 to 2005, the period of increased protection for eelgrass, 380 dock permits were issued in San Juan County, a rate of 30 per year. Dock permit activity on shoreline parcels with eelgrass present from 1972 to 1992 included 107 permits, a rate of 5 per year. Dock permit activity on shoreline parcels with eelgrass present from 1993 to 2005, after adoption of increased protections, included 133 permits, a rate of 10 per year. Despite improved eelgrass protection under county code, the annual rate of dock permit activity doubled on parcels with eelgrass during this time. Because the rate of permit activity is related to overall shoreline development pressures and county growth (and incomplete county permit records do not support linking this analysis to building permit activity), it is informative to look at the percentage of dock permit activity occurring on parcels with and without eelgrass over the two time periods. 48% of dock permit activity from 1972 to 1993 occurred on parcels with eelgrass present. After eelgrass protections were implemented in 1993, the percentage of dock permit activity on parcels with eelgrass present increased slightly, to 50%.

Table 23. Dock permit activity and county eelgrass protection

Docks and Eelgrass Policy	Total Dock Permit Activity # (annual rate)	Dock Permit Activity on Parcels with Eelgrass Present # (annual rate)
1972-1992 (pre eelgrass protection)	223 (11 per year)	107 (5 per year)
1993-2005 (post eelgrass protection)	261 (20 per year)	133 (10 per year)


Eelgrass
Dock Permits on Parcels with Eelgrass1972-1992
Dock Permits on Parcels with Eelgrass 1993-2005

Bulkheads and Forage Fish Spawning Beaches

Bulkhead permit activity in relation to adoption of environmentally sensitive areas protection and increased information on the location of forage fish spawning beaches was analyzed. The number, rate and location of bulkhead permit activity was determined for two time periods: 1972-1992 and 1993-2005, representing the adoption of protection of forage fish spawning habitats as a *marine habitat area* under the Environmentally Sensitive Areas section of San Juan County Code. In addition, the number and rate of bulkhead permits for parcels with documented forage fish spawn was determined for the time periods 1972-1992 and 1993-2005 to evaluate the influence of policy changes as well as two additional time periods, 2000-2002 and 2003-2005, representing equal time periods pre and post completion of mapping of spawning habitat in 2003. Updated information on forage fish spawning locations was provided to San Juan County planners, permit reviewers and managers in 2003 (FSJ 2003).

Environmentally sensitive areas policy adoption and bulkhead permit activity

Analysis of bulkhead permit activity in relation to adoption if environmentally sensitive areas policy was conducted with the subset of the bulkhead permits (205 of 315) in the county database with tax parcel information, to support mapping and ensure location on marine shorelines. A total of 205 bulkhead permits with tax parcel data are recorded in the county's permit database from 1972 to 2005. Analysis of bulkhead permit activity for the time periods before (1972-1992) and after (1993-2005) adoption of environmentally sensitive areas policies which call designate forage fish spawning beaches as critical habitat, includes the summary of all permit types, substantial development permits, violations, and exemptions.

From 1972 to 1992, 79 bulkhead permits with parcel data were issued on marine shorelines in San Juan County, a rate of 3.76 per year. From 1993 to 2005, after adoption of environmentally sensitive areas policies, 126 bulkhead permits with parcel data were issued on marine shorelines in San Juan County, a rate of 9.67 per year. Bulkhead permit activity on parcels with forage fish spawning from 1972-1992 included 9 permits, an annual rate of 0.42 per year. Bulkhead permit activity on parcels with forage fish spawning from 1993-2005 included 11 permits, an annual rate of 0.85 per year. The percentage of bulkhead permit activity on parcels with forage fish declined slightly after the adoption of environmentally sensitive areas policies, to 9% from 11%.

Table 24. Bulkheads and Forage Fish Spawn Sites

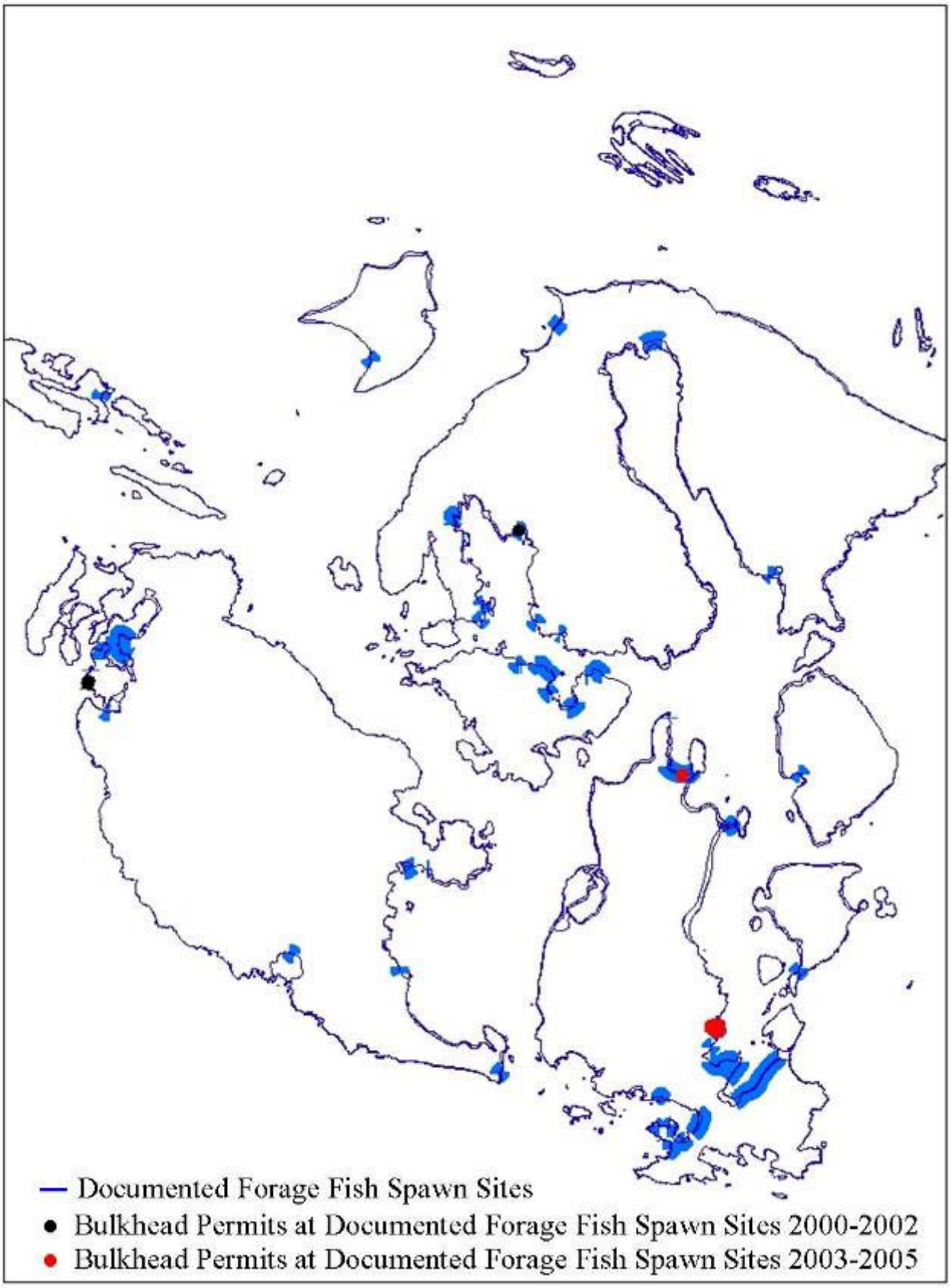
Bulkheads and Forage Fish	Bulkhead Permit Activity # (annual rate)	Bulkhead Permit Activity at Documented Forage Fish Spawn Sites # (annual rate) % total
1972-1992 (pre forage fish protection)	79 (3.76 per year)	9 (0.42 per year) 11% of total bulkhead permits
1993-2005 (post forage fish protection)	126 (9.67 per year)	11 (0.85 per year) 9% of total bulkhead permits

Best available science on forage fish spawning location and bulkhead permit activity

To compare bulkhead permit activity in relation to completion of the forage fish spawning habitat assessment project, which provided forage fish spawning locations to county planners and managers, a subset of the database representing the 3 years before and after final map distribution was selected for analysis. From 2000 to 2002, before spawning maps were available, 26 bulkhead permits with parcel information were issued on marine shoreline parcels in San Juan County, including 5 new bulkheads, 15 repairs and 6 code violations. From 2003-2005, after completion of forage fish spawning site maps, 31 bulkhead permits with parcel information were issued on marine shoreline parcels in San Juan County, including 10 new bulkheads, 15 repairs and 6 code violations. These results indicate no change in repairs or code violations, but a doubling of new bulkhead permits. Bulkhead permit activity on documented forage fish spawning beaches remained unchanged, with 2 bulkhead permits issued at documented forage fish spawning sites from 2000-2002 and 2 bulkhead permits issued at documented forage fish spawning sites from 2003-2005.

Table 25. Bulkheads and Updated Forage Fish Spawn Site Data

Bulkheads and Forage Fish	Bulkhead Permit Activity # (annual rate)	Bulkhead Permit Activity at Documented Forage Fish Spawn Sites # (annual rate) % total
2000-2002 (pre new spawn maps)	26 (9 per year)	2 (0.66 per year)
2003-2005 (post new spawn maps)	31 (10 per year)	2 (0.66 per year)


Documented Forage Fish Spawn Sites
Bulkhead Permits at Documented Forage Fish Spawn Sites 2000-2002
Bulkhead Permits at Documented Forage Fish Spawn Sites 2003-2005

Conclusions

A primary conclusion of Friends of the San Juans' *Shoreline Permit Analysis for San Juan County, 1972-2005* is that the San Juan County Department of Community Planning and Development's (CDPD) Permit Database does not support analysis of shoreline (or inland) development activities. Significant changes to the database are needed to support the analysis of individual or cumulative impacts as directed by the Shoreline Management Act. The CDPD Permit and Assessor databases could provide an opportunity to objectively conduct programmatic, policy and spatially explicit analyses to inform decision making if the data were recorded in a manner that supports future analysis by project type, permit type, year and location, as well as individual and cumulative impacts required by state law. There is also an opportunity to create spatially explicit GIS databases linked to county permit databases and ensure all county departments are utilizing compatible database systems and recording protocol.

Shoreline Permit Activities Analysis

Results of the Shoreline Permit Analysis clearly indicate that the incremental and cumulative impacts of shoreline development in the San Juans raise serious management concerns. Key findings from this element of the analysis are summarized below.

- The analysis indicated that there are inconsistencies in the implementation of County Code regarding permit type. Many projects with the same project description received different permit types. More detailed review of exemption and substantial development permit activity is warranted to determine if changes are needed in the implementation of permit type requirements.
- Shoreline exemptions comprise 43% of land use permits on shoreline tax parcels. As shoreline resource protection is a high priority for resource management, and incremental shoreline development is the most significant threat to nearshore habitats, more detailed analysis of shoreline exemption activity and impacts is warranted to determine if changes to County Code are needed.
- Code violations comprise 14% of land use permits on shoreline tax parcels. As code violation permit activity in San Juan County is complaint driven, the actual number of shoreline violations is likely higher. More detailed analysis of code violations is needed to inform management changes. A high percentage of permit activity in certain categories such as clearing and grading are code violations, indicating that improved education, enforcement, incentives and deterrents are needed.
- While review of permits by individual project type can yield low activity numbers and rates, the combined results of shoreline permit activity indicates high development activity on shorelines in San Juan County. For the period 2000 to 2005 927 land use permits were issued with recorded tax parcel information to ensure location on marine on shorelines, an annual rate of 155 permits. When building permit activity for shoreline parcels is included for the same time period (930 shoreline building permits 2000-2005), the annual rate of permit activity on shoreline parcels increases to 310 permits per year.
- The majority of *Shoreline* permit violations are associated with residential development, including placement of buildings and structures (decks, outbuildings, roads) and removal of trees and native vegetation. More education and clarity on shoreline development rules in the residential pre-application permit process is needed.

- Initial analysis of the geographic distribution of permit activity indicates that shoreline permit activity in San Juan County is widely distributed. More detailed analysis of specific embayments, geologic units or watersheds is needed.
- Increasingly high permit activity levels, diverse project types and broad geographic distribution of shoreline development actions on San Juan County shorelines support the need for a cumulative impact analysis of shoreline permit activity.

Shoreline Permit Activity Policy Analysis

Our findings indicate that protection of the *marine habitat areas* under the Interim Environmentally Sensitive Areas section of San Juan County Code is not reducing the numbers, annual rates or percentages of shoreline project permit activity within protected habitats for the two project and habitat types we investigated: docks associated with eelgrass habitat and bulkheads associated with forage fish spawning habitat. These project types and habitats were selected for analysis as the habitat impact of the project activity type are well known and county-wide data on the location of habitats is available.

The annual rate of dock permit activity on parcels with eelgrass present doubled in the time period after improved protection policies were adopted by the county. During that same time period the percentage of dock permits issued by the County on parcels with eelgrass was essentially unchanged (48% before and 50% after).

The annual rate of bulkhead permit activity on documented forage fish spawning beaches also doubled after adoption of Interim Environmentally Sensitive Areas Policies. During that same time period the percentage of bulkhead permit activity on parcels with documented forage fish spawn declined slightly (to 9% from 11%). New information on forage fish spawning locations had no impact on the number or rate of bulkhead permits issued by the County.

A more detailed analysis of the county permitting process is needed to determine the reason the policies are not appropriately influencing project permit decisions. Some of the reasons for permit actions not well connected to policy include:

a) limitations of the policies themselves or how the policies are reflected in code;
b) problems in implementation of policies and associated code;
c) discrepancies between individuals and/or levels of decision makers; and
d) illegal actions.

Another factor that may influence but does not determine county permit activity is the state and federal permit processes for many shoreline projects, including the State Hydraulic Permit Approval Process and Federal Section 404 review.

Recommendations

The Friends of the San Juans *Shoreline Permit Analysis Project* highlights the need for improvements in shoreline management within San Juan County. Over one third of the total tax parcels in San Juan County are located on marine shorelines. Currently, 52% of shoreline tax parcels in San Juan County are developed (parcels with a structure valued over $5,000). Improved understanding and management of the incremental and cumulative effects of shoreline development actions will play an essential role in the future health of the ecosystem and human communities in San Juan County.

Shoreline Permit Analysis Project recommendations fall into four primary categories including:
1) improved permit recording;
2) improved implementation of policy and code;
3) additional research; and
4) cumulative impact assessment.

1) Improved County Land Use and Building Permit Database

The County needs an improved permit record system that enables and supports analysis of permit records. At a minimum, project types need to be searchable and spatially explicit data must be included for all permit records. Review of the current database with future analysis in mind would help identify additional information or structural changes to the current database that would support the type of meaningful analysis necessary to ensure nearshore habitat protection. For example, searchable information on bulkhead length, width and tidal elevation would enable analysis of the total habitat area covered by these structures and improve the connection between policy and permit analysis and resource impact.

2) Improved Implementation of Policy and Code

A stronger connection between policy intent and application of code requirements is needed. A specific feedback mechanism that requires review and analysis of permit activity trends and triggers revisions or updates to local land use policies and code could be implemented to accomplish this. Review of implementation procedures, including staff training and interdepartmental coordination could improve nearshore habitat protection by existing code. In addition, updates to code may be required. The link between the multitude of existing county plans that include strong shoreline protection goals and code language, as well as interpretation and implementation of these plans and goals must be clear and consistent. Communication between County departments, including Community Development and Planning, Public Health, and Public Works, will be essential to achieving shoreline protection.

3) Additional Research

The areas of additional research that stand out as particularly important include:

a) work to support stronger understanding of the relationships between development activity and resource impact;
b) improved understanding of shoreline exemptions as they comprise such a large proportion of the projects;

c) targeted review of code violations to inform ongoing efforts to improve this area of county administration of the Growth Management Act and Shoreline Master Program.
d) programmatic review of state and federal shoreline permit processes. Understanding of how the three tiers of oversight interact is needed.

In addition, geographic analysis of permit activity, for example by embayment, watershed or drift cell, to identify specific areas or habitats in need of updated policy would be informative. Overall, an extensive cumulative impact assessment of development activity for San Juan County shorelines is needed.

a) Resource Impact Research:

More detailed information on project activities is needed to support a cumulative impact assessment in terms of the effects of shoreline development on the specific habitat or species of concern. Analysis of a random subset of permits by project type would provide information on which project types are most impacting marine resources, and further work to develop causal relationships could focus on those most important impacts. For example, analysis of dock permit details such as float size and proximity to eelgrass through the project proposal, permit and implementation phases would help focus efforts to improve eelgrass protection through dock permitting. For bulkhead permit analysis, trends in bulkhead material, length, volume of material and tidal elevation could be identified and used in a quantitative assessment of the impacts of armoring on forage fish spawning habitat. More detailed permit review would also support quantification of impacts, such as area of shoreline clearing and grading, linear feet of armoring, extent of overwater structures. Each of these could then be analyzed separately or in combination in terms of specific geographic locations, from within a small embayment to the county scale.

b) Exemptions:

Analysis of a subset of the exemptions, including site visits given for different project activity types, will better understanding of the potential impacts of exemptions and answer the following questions related to permit and project compliance and resource impact: Did the projects as defined in the application meet exemption requirements? Were the conditions of the project as defined in the exemption process what was implemented?

c) Violations

Detailed analysis of a subset of shoreline code violations by project activity type can help focus efforts to improve county code enforcement, including deterrents and restoration of impacted resources. Information is not available in the county permit database on the outcome of code violation investigations. Detailed review of a random subset of code violations by project type could inform understanding of the scope of the problem of violations and its long term resource impact. Analysis could include: percentage of complaints that become violations by activity type and action taken by activity type (no action, stop work order, fine, after-the-fact permit issued, restoration or mitigation action required). In addition, a subset of after-the-fact permits could be sampled to determine if the activity would likely have received a permit before implementation and a subset of

restoration/mitigation requirements could be reviewed to determine if the action was a) implemented as required and b) met restoration objectives.

d) State and Federal Policies:

A combination of local, state and federal policies and regulations recognize the importance of shoreline resources and in combination work to minimize damage from development activities. A complete picture of shoreline protection will require analysis of county, state and federal permitting. Ongoing efforts by the Washington Department of Fish and Wildlife to conduct permit and policy analysis of their administration of the State Hydraulic Code can inform this effort. Permit analysis of each level of permitting supports evaluation of the effectiveness of each protective policy layer, and can also identify potential coordination and consistency issues among and between the different processes.

For example, inconsistencies between the management entities on permit decisions related to docks and eelgrass protection have been documented in San Juan County but a detailed analysis that would support policy changes has not been completed. An analysis of the decisions made at each policy level: County (staff recommendation, hearing examiner, appeal if relevant), WDFW hydraulic permit, and Army Corps of Engineers section 404 review could evaluate the effectiveness of each protective policy layer, and identify potential coordination and consistency issues among the processes while answering the following primary questions: What is the number, location and rate (percent of total dock applications) of docks permitted in proximity to eelgrass in San Juan County? Which permitting entity affords the most protection to eelgrass habitat? How many docks have been permitted over eelgrass and what mitigation, if any, was required? What was the success of mitigation?

These results would be directly applicable to ongoing county land use processes such as the Critical Areas Ordinance Update and the Shoreline Master Program, but would also inform agency processes such as the Habitat Conservation Planning Process underway for the programmatic Hydraulic Project Approval Washington Department of Fish and Wildlife.

4) Cumulative Impact Assessment

Analysis of shoreline permit activity in San Juan County highlights the need for cumulative impact analysis to inform policy, planning and permit review actions associated with development on shoreline parcels. While activity within any project activity type may be relatively low when viewed independently, summary numbers (excluding building permit activity) indicate a high level of permit activity occurring on shoreline parcels: 1,642 permits from 1972 to 1999 (59 per year) and 927 permits from 2000-2005 (155 per year).

The Washington State Shoreline Management Act passed by the citizen's in 1972 in a statewide referendum *"to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines"* which clearly acknowledges cumulative impacts. Despite this policy goal, specific requirements to address cumulative impacts are largely absent from San Juan County Code, even within the Shoreline Master Program.

The Washington State Administrative Code includes cumulative impact assessment as a "governing principle" of Master Programs:

> *"Local master programs shall evaluate and consider cumulative impacts of reasonably foreseeable future development on shoreline ecological functions and other shoreline functions fostered by the policy goals of the act. To ensure no net loss of ecological functions and protection of other shoreline functions and/or uses, master programs shall contain policies, programs, and regulations that address adverse cumulative impacts and fairly allocate the burden of addressing cumulative impacts among development opportunities. Evaluation of such cumulative impacts should consider:*
> *(i) Current circumstances affecting the shorelines and relevant natural processes;*
> *(ii) Reasonably foreseeable future development and use of the shoreline; and*
> *(iii) Beneficial effects of any established regulatory programs under other local, state, and federal laws. It is recognized that methods of determining reasonably foreseeable future development may vary according to local circumstances, including demographic and economic characteristics and the nature and extent of local shorelines.*
> (WAC 173-26-186. 3.D)

Governing principles are intended to provide "foundational concepts that underpin the guidelines, guide the development of the planning policies and regulatory provisions of master programs, and provide direction to the department in reviewing and approving master programs" (WAC 173-26-186). Specific sections of the Washington State Administrative Code that require inclusion of cumulative impacts in decision making include shoreline conditional uses and actions associated with residential shoreline development in the shoreline (WAC 173-26-241. (1) (b) (i) and (j)).

Despite clear policy level direction for cumulative impact assessment of shoreline development, specific regulatory requirements for addressing cumulative impacts within San Juan County code are limited. The term cumulative impacts is not defined in San Juan County code but is used in the followed code sections: *18.20 - definition of "feasible alternative"; 18.50.180 – Aquaculture; 18.60.200.F - Concurrency test methodologies, also for SF residences and simple land divisions;18.80.090 - Discretionary uses; Table 8.2 generally; Table 8.2 under surface water, pollution accumulation of sediment and note 1; 18.80.100 - conditional uses, variances; D.4 is shoreline variances and shoreline conditional uses and 18.90.010 - Legislative decisions and for Master Planned Resorts* (SJC UDC).

In practice at the project permit review stage, cumulative impacts are rarely examined. If they are, cumulative impacts are analyzed for the precedent they may establish (Arnold 2007). No evaluation of the potential cumulative impact to the resource is attempted at the project stage. At the County Plan level, such as the watershed management plan, some projections of future development based on current development standards have been completed. This forward focused perspective is common in planning but has limited value in resource protection because no assessment of the cumulative impact of past actions is made. In addition, County policy as described in broad planning documents is not tightly linked to regulation of individual project actions through the San Juan County Unified Development Code. As the cumulative impact of incremental shoreline development has been identified as a top threat to marine ecosystem health

in the San Juan Archipelago, meaningful attempts must be made to evaluate cumulative impacts and adjust policies and specific development code language accordingly.

Completion of the much needed cumulative impact assessment for San Juan County would face many challenges. Few examples of cumulative impact assessments are available as models, and none have been found that address the scale of an entire county. Cumulative impacts assessments are time consuming and difficult, and there few clear answers or accepted thresholds (City of Bainbridge 2002). Land use changes intended to proactively address cumulative impacts face a "temporal mismatch", as the impacts to the resource may not be evidenced for years, while the limitations on development are felt immediately (Folkerts et al. 2007).

A successful cumulative impact assessment of the effects of shoreline development will likely require a partnership between San Juan County and resource agencies, as agencies can provide needed technical expertise to inform local land use decisions. A cumulative impact assessment integrated within existing growth management planning efforts, such as Critical Areas Ordinance or Shoreline Master Program updates is much more likely to be utilized as an effective decision-making tool than an independent assessment not tied to concrete policy mandates.

References

Arnold, L. 2007. Personal communication. Friday Harbor, WA.

Barsh, R. and T. Wyllie-Echeverria. 2006. Fish use of nearshore habitat in San Juan County, 2005. Report to the Washington State Salmon Recovery Funding Board.

Brennan, J.S., and H. Culverwell. 2004. Marine Riparian: An Assessment of Riparian Functions in Marine Ecosystems. Published by Washington Sea Grant Program Copyright 2005, UW Board of Regents Seattle, WA. 34 p.

Brewer, S., G. Peterson and J. Kliem. 2007. Land Use Permit Tracking: monitoring and evaluation of land use regulatory programs for salmon recovery planning in Hood Canal. In: Proceedings of the 2007 Georgia Basin Puget Sound Research Conference. Vancouver, BC.

Brewer, S., J. Watson, D. Christensen and R. Brocksmith. 2007. Hood Canal and Eastern Strait of Juan de Fuca summer chum recovery plan: the Hood Canal Coordinating Council Approach to Salmon Recovery Planning. In: Proceedings of the 2007 Georgia Basin Puget Sound Research Conference. Vancouver, BC.

Brewer, S. and G. Peterson. 2007. Projecting build out conditions in the Hood Canal Watershed: impervious surface estimates for watershed planning and salmon recovery. In: Proceedings of the 2007 Georgia Basin Puget Sound Research Conference. Vancouver, BC.

Carrasquereo-Verde, J., T. Abbe and S. Morrison. 2005. Bulkheading in Thurston County: impacts on forage fish spawning habitat. Proceedings of the 2005 Puget Sound Georgia Basin Research Conference. Herrera Environmental Consultants.

City of Bainbridge Island. 2002. Blakely Harbor cumulative impact assessment. City of Bainbridge Island Department of Community Development and Planning.

Dayton PK (1985) Ecology of kelp communities. Annual Review of Ecological Systematics 16:215-45.

Duggins DO, Eckman JE, Siddon CE, Klinger T (2003) Population, morphometric and biomechanical studies of three understory kelps along a hydrodynamic gradient. Mar Ecol Prog Ser 265:57-76

Friends of the San Juans. 2004. Forage Fish Spawning Habitat Assessment and a Summary of Protection and Restoration Priorities for San Juan County Washington. Final Project Report. Friday Harbor, WA.

Friends of the San Juans. 2006. San Juan County Nearshore Impact Analysis. Unpublished Report. Friday Harbor, WA.

Hayden-Spear J (2006) Nearshore habitat associations of young-of-the-year copper (*Sebastes caurinus*) and quillback (*S. maliger*) rockfish in the San Juan Channel, Washington. Thesis. University of Washington, Seattle, WA. 30p.

Hayden-Spear J (2006) Nearshore habitat associations of young-of-the-year copper (*Sebastes caurinus*) and quillback (*S. maliger*) rockfish in the San Juan Channel, Washington. Thesis. University of Washington, Seattle, WA. 30p.

Steneck RS, Graham MH, Bourque BJ, Corbett D, Erlandson JM, Estes JA, Tegner MJ (2002) Kelp forest ecosystems: biodiversity, stability, resilience and future. Environmental Conservation 29(4):436-459.

Kerwin, J. 2002. Salmon and Steelhead Habitat Limiting Factors Report for the San Juan Islands (Water Resource Inventory Area 2). Washington Conservation Commission. Olympia, WA.

Morrison, S.W. 2001. Bulkheading: a habitat we just can't kick. Puget Sound Georgia Basin Research Conference proceedings.

Nightingale, B. and Charles Simenstad. 2001. Overwater Structures: Marine Issues. Submitted to Washington Department of Fish and Wildlife, Washington Department of Ecology and the Washington Department of Transportation. University of Washington Wetland Ecosystem Team School of Aquatic and Fishery Sciences. Seattle, WA.

Penttila, D.E. 1999. Documented Spawning Areas of the Pacific Herring (Clupea), Surf Smelt (Hypomesus), and Pacific Sand Lance (Ammodytes) in San Juan County, Washington. Washington Dept. of Fish and Wildlife, Marine Resources Division. Manuscript Report. LaConner, WA.

Penttila, D.E. 2001. Effects of Upland Vegetation on Egg Survival for Summer-Spawning Surf Smelt on Upper Intertidal Beaches in Puget Sound. Puget Sound Research Proceedings – Puget Sound Water Quality Action Team. Olympia, WA.

Rice, C. 2006. Effects of Shoreline Modification on a Northern Puget Sound Beach: Microclimate and Embryo Mortality in Surf Smelt (Hypomesus pretiosus). Estuaries and Coasts. Vol 29, No. 1. p. 63-71 .

San Juan County Shoreline Master Program.

San Juan County Marine Stewardship Area Plan. 2007. San Juan County Marine Resources Committee.

Shared Strategy. 2005. Puget Sound Chinook Salmon Recovery Plan. Shared Strategy for Puget Sound. Olympia, WA.

Sobocinski, K. 2003. The Impact of Shoreline Armoring on Supratidal Beach Fauna of Central Puget Sound. MS Thesis, University of Washington, Seattle, Washington. 83pp.

Williams, G. and R. Thom. 2001. Marine and Estuarine Shoreline Modification Issues. Submitted to Washington Department of Fish and Wildlife, Washington Department of Ecology and the Washington Department of Transportation. Prepared by Battelle Marine Sciences Lab, Sequim, WA.

Wyllie-Echeverria, T. and R. Barsh. 2006. Habitat and fish use of stream mouths and beaches on Orcas, Shaw and Waldron Islands 2003-2004: part one. Unpublished report.

Zelo, I., H. Shipman and J. Brennan. 2000. Alternative Bank Protection Methods for Puget Sound Shorelines. Washington Department of Ecology Publication #00-06-012. Olympia, WA.