



SPECIES

The living resources of Puget Sound are the ultimate indicators of the Sound's health, and the picture they paint for us today is troubling. The Sound's diverse web of life is at risk. The building blocks of a healthy environment—clean water, abundant habitat and an intact food web—continue to erode.

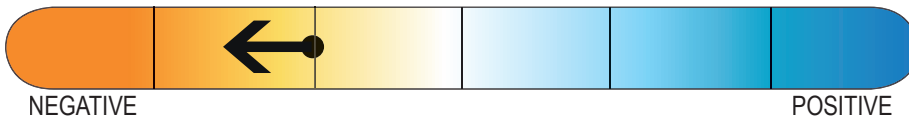
The effects of this erosion can be seen in declines in eelgrass, forage fish, salmon, rockfish, marine birds and orcas.

Currently, 10 species in Puget Sound are listed as threatened or endangered by the state or federal government. An additional 33 marine species in Puget Sound—three invertebrates, 22 fish, 7 birds, and one mammal—are identified by the state or federal governments as species of concern, meaning they are at risk.

Loss of key species can become a self-reinforcing loop. For example, declines in eelgrass and forage fish can trigger a domino effect that reaches many other populations of species throughout the Sound.



INDICATOR: ORCAS



Three main orca populations visit the waters of Puget Sound regularly but only one—southern resident whales—return each summer to Puget Sound and the waters around the San Juan Islands.

In 2005, southern resident orcas were added to the federal endangered species list after scientists determined they are a genetically distinct population that do not breed with other orca populations.

STATUS

The population of southern resident orcas was 86, at press time. The historic population of Puget Sound orcas, before European settlement, was estimated at 150-250 whales.

TRENDS

Between 1974 and 1995, southern resident orca populations increased to 98 but dropped sharply in 2001 to 81 whales, a loss of 17 percent.

Although the number of southern resident orcas has increased to 86, these animals continue to face threats to their health from a number of stresses including PBTs and other contaminants and declines in prey. The whales are also at risk from major oil spills and from increased noise from whale-watching boats and other vessels.

FIGURE 8-21 Trends in southern resident orca population 1974-2006

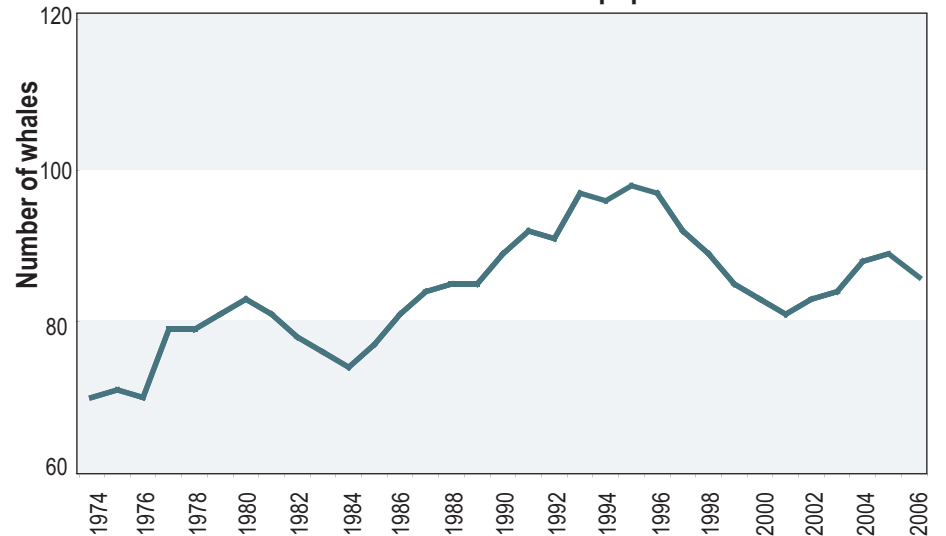


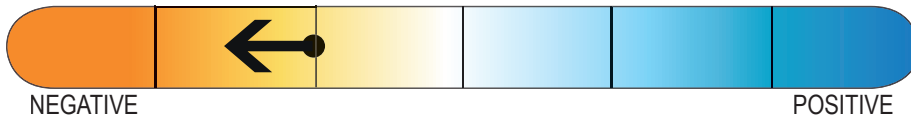
FIGURE 8-21: Between 1974 and 1995, southern resident orca populations increased to 98 but dropped sharply in 2001 to 81 whales, a loss of 17 percent. Although the number of southern resident orcas has increased to 86, these animals continue to face threats to their health. *Source: Center for Whale Research.*



PHOTOS: Orca whales breaching. | Tim Ransom; (indicator) Orca whales near San Juan Island. | Shutterstock.com/Matt Ragen.



INDICATOR: SALMON



Wild salmon are a keystone of the Puget Sound ecosystem, with numerous species returning to spawn in streams across the region. As juveniles, salmon are a food source for other fish and marine birds; later in life they are a favored prey of orca that return annually to Puget Sound.

In the last 50 years, overfishing, dams and habitat degradation have led to major declines in several of Puget Sound’s approximately 200 salmon stocks. In 1999, Puget Sound chinook salmon, the largest of the Pacific salmon, were listed as threatened under the federal Endangered Species Act, as were Hood Canal summer-run chum and bull trout.

In March 2006, NOAA Fisheries announced it is considering listing all stocks of Puget Sound steelhead as threatened or endangered. A decision is expected in 2007.

STATUS

In 2002, the most recent data available, there were 207 salmonid stocks in Puget Sound, according to WDFW inventory data. Stocks include chinook, chum, coho, pink, sockeye and steelhead. Of the total number, 81 stocks are healthy, 52 are depressed and 12 are critical. The status for 62 stocks is unknown, and eight are extinct.

TRENDS

When 2002 data is compared to 1992 data, salmonid stocks are on a downward trend. The most significant statistics are in the area of extinct stocks. In 1992, there was one extinct stock; in 2002, that number had increased to eight. In that same period, the number of healthy stocks declined from 93 healthy stocks to 81. Although monitoring continues, the salmonid stock inventory data has not been updated since 2002.

Salmon stocks in Puget Sound

PUGET SOUND TOTAL	1992		2002	
	NUMBER OF STOCKS	PERCENT OF STOCKS	NUMBER OF STOCKS	PERCENT OF STOCKS
Healthy Stocks	93	45%	81	38%
Depressed Stocks	44	21%	52	24%
Critical Stocks	11	5%	12	6%
Extinct Stocks	1	<1%	8	4%
Not Rated Stocks	N/A	N/A	2	<1%
Unknown Stocks	60	29%	60	28%
Total	209		215	

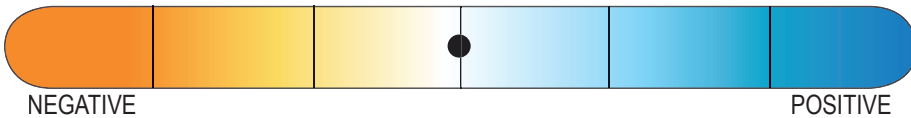


PHOTOS: Coho salmon. | USFWS; (indicator) Chum salmon make their annual return to spawn in Kennedy Creek, South Puget Sound. | Terry Hull.



JIM RAMAGLIA

INDICATOR: GROUND FISH



Puget Sound has more than 150 species of groundfish, those fish that live near or on the bottom of the Sound for most of their adult lives. These fish play an important role in the food web, serving as a link between nearshore and midwaters and the sea floor. Many of the harvestable groundfish species are in sharp decline including Pacific cod, hake, walleye pollock and several species of rockfish.

More than 27 species of rockfish—an extremely long-lived group of fish—have been recorded in the inland marine waters of Washington State. These slow-growing species do not reproduce until fully mature, which makes them particularly vulnerable. Scientists measure rockfish health by their ability to reproduce, known as their spawning potential. Spawning potential declines when there are fewer fish of spawning age or when individual fish produce fewer eggs.

STATUS

While the majority of Puget Sound groundfish stocks are in good condition, the status for individual species is mixed. Some species are in steep decline while others are improving. Pacific cod, walleye pollock, Pacific hake, rockfish and spiny dogfish are in depressed or critical condition in Puget Sound. Lingcod, English sole, starry flounder, sand sole and Pacific halibut populations have increased.

TRENDS

Based mainly on sport-fishing surveys and harvest information, the condition of groundfish stocks improved slightly during the past four years. This improvement is most apparent in several species of flatfish including English sole, which saw increases ranging from 17 percent to 42 percent, and lingcod, which saw increases ranging from 68 percent to 104 percent since the 1980s.

FIGURE 8-22 Groundfish stock conditions 2002-2006

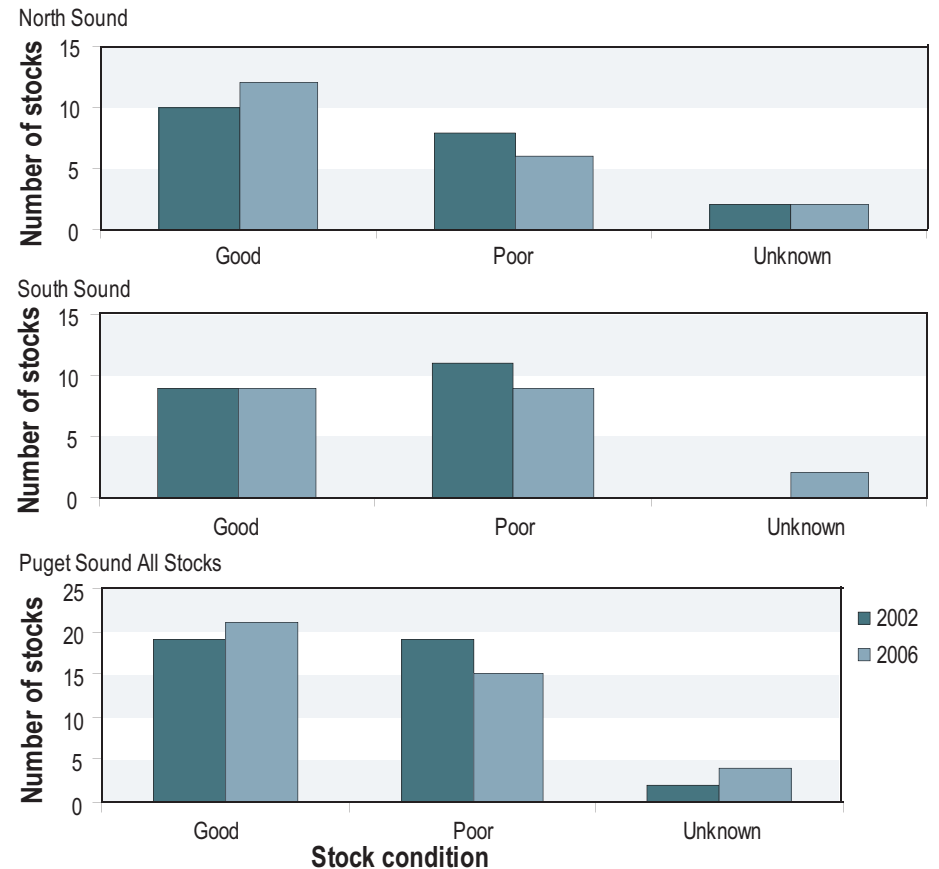


FIGURE 8-22: The condition of groundfish stocks improved slightly during the past four years. Some species are currently doing well (lingcod, English sole, starry flounder, sand sole and Pacific halibut), whereas other species are depressed or in critical condition (Pacific cod, walleye pollock, Pacific whiting, rockfish, and spiny dogfish). Source: WDFW.

PHOTO: (indicator) Lingcod. | Jim Ramaglia.



JAKE GREGG & PAUL
HERSHBERGER

INDICATOR: HERRING



There are 19 designated populations of Pacific herring in Puget Sound. This small fish serves as food for a wide variety of seabirds, marine mammals and predatory fish. Estimates of herring spawning biomass are calculated annually to determine adult herring population size for Puget Sound herring stocks.

STATUS

Based on acoustic trawl surveys and spawn deposition surveys conducted by WDFW, the current estimate of spawning biomass for all Puget Sound herring stocks is approximately 12,000 tons.

TRENDS

Across Puget Sound, estimates of herring spawning biomass have varied from year to year but most stocks have declined in the last five years. In 2002, the combined biomass of Puget Sound herring stocks was estimated at 17,700 tons. In 2004, that figure dropped to about 11,000 tons—a decrease of about 40 percent. In 2006, biomass estimates increased to 17,765 tons.

Cherry Point herring, once the largest stock in Puget Sound, have declined steeply in the past 30 years, dropping from an estimated 12,000 tons of spawning herring in 1976 to approximately 2,200 tons in 2006, a decline of 82 percent.

FIGURE 8-23 Estimated spawning biomass of Puget Sound herring by region 1976-2005

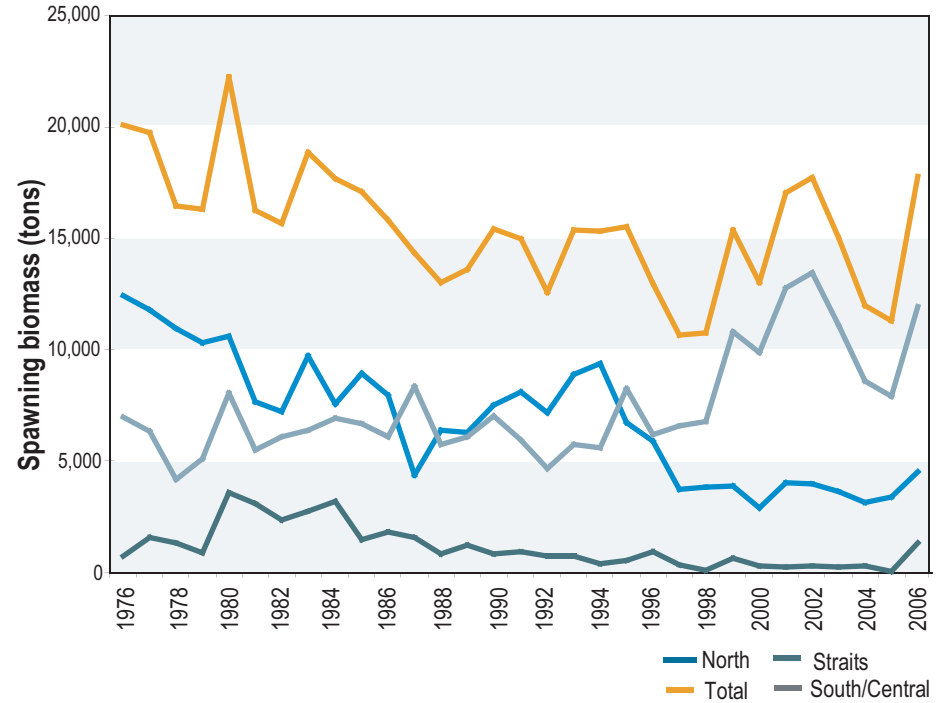
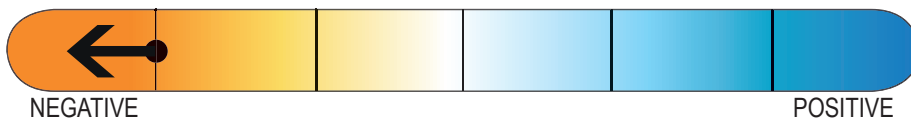


FIGURE 8-23: Across Puget Sound, estimates of herring spawning biomass have varied from year to year but most stocks have declined in the last five years. *Source: WDFW.*

PHOTO: (indicator) Herring. | Jake Gregg and Paul Hershberger, USGS.



INDICATOR: PINTO ABALONE



Pinto abalone play an important role in shaping the nearshore rocky habitat. They are one-shell mollusks that graze on algae, opening up habitat for other invertebrates to colonize. This species, one of the smallest of abalone, rarely grows to more than six inches long. The pinto abalone habitat range includes northern Puget Sound and the San Juan Archipelago, and they have not historically been found in central or southern Puget Sound.

STATUS

Once fairly abundant in the Strait of Juan de Fuca and the San Juan Archipelago, the pinto abalone population continues to decline, despite the fact that commercial harvest has never been permitted and statewide recreational harvest was closed in 1994. In 2004, the federal government listed pinto abalone as a species of concern. Species estimate information is available from 10 study sites in the San Juan Archipelago.

TRENDS

Abalone abundance in 10 sites in the San Juan Archipelago has steadily decreased from a peak of 351 animals in 1992 to 103 animals in 2005. Changes have also been noted in shell size. Scientists are recording a shift from smaller to larger shells, reflecting a change in population from younger to older animals. Abalone smaller than 2.5 inches are nearly non-existent. The shell length data suggest that continued population declines may be the result of a lack of reproductive success.

FIGURE 8-24 Pinto abalone abundance in the San Juan Archipelago 1992-2005

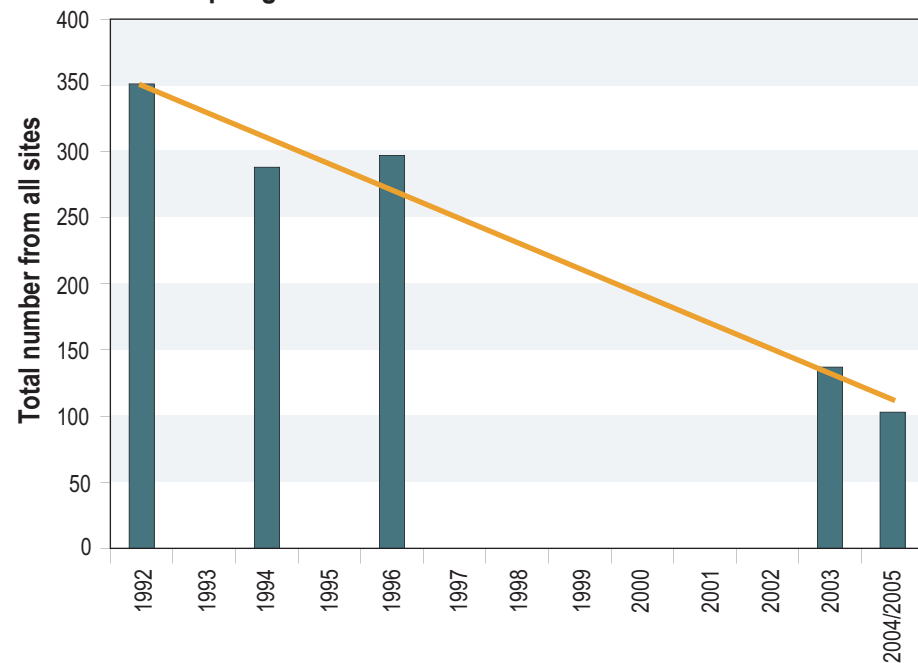
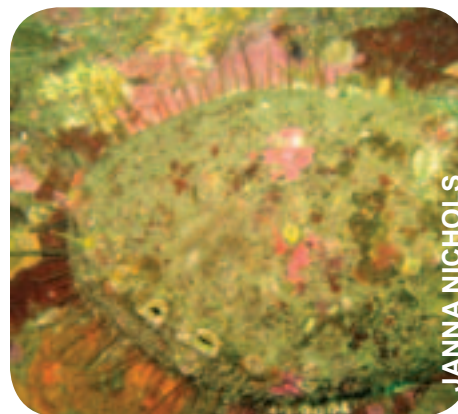


FIGURE 8-24: Pinto abalone abundance at 10 monitoring sites in the San Juan Archipelago indicates a steady decline in the total number of animals between 1992 and 2005. Despite the elimination of recreational harvest in 1994, pinto abalone continues to decline. *Source: WDFW.*



PHOTOS: Pinto (a.k.a. Northern) abalone. | Janna Nichols; (indicator) Pinto abalone. | Janna Nichols.



INDICATOR: MARINE BIRDS



More than 100 species of marine birds, including seabirds, sea ducks and shorebirds, are either part-time or full-time residents of Puget Sound. Many of these species are at or near the top of the food chain and thus are important indicators of overall ecosystem health.

STATUS

A total of 19 of the 30 most common marine bird species in northern Puget Sound decreased by 20 percent or more between 1978 and 2004, according to Western Washington University (WWU). Overall, the total population of wintering marine birds in this northern area decreased by 27 percent during this period. It is not entirely known what is driving this decline but some likely factors include decreases in forage fish populations, including herring spawn at Cherry Point and Discovery Bay, changing migrations patterns, predation, habitat loss, hunting, by-catch from fishing operations (including derelict fishing gear), and harm to breeding grounds in the Arctic. Data for surf scoters and western grebes indicate a dramatic decrease in populations of both species over the past 25 years.

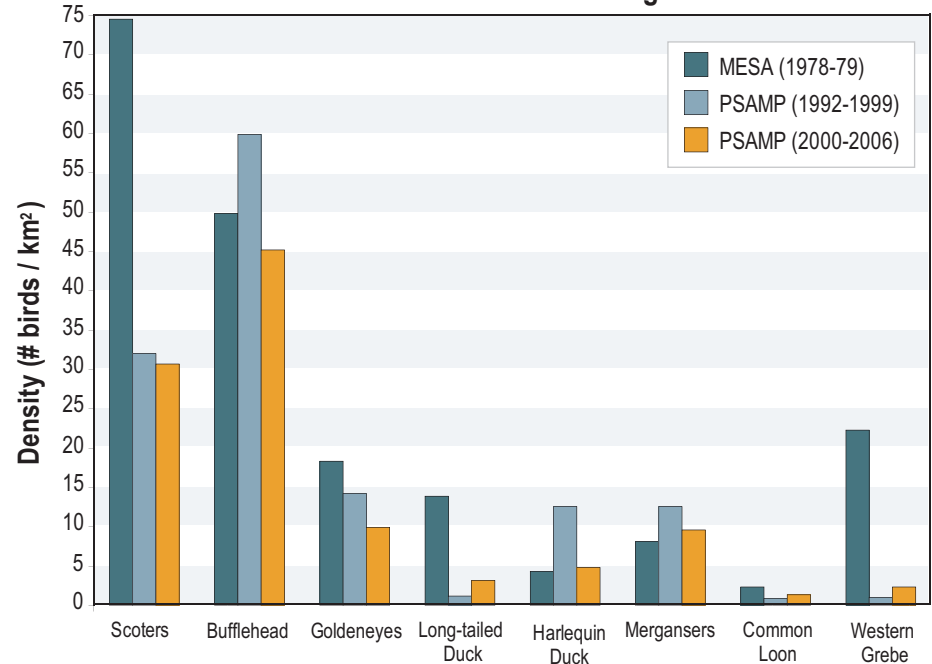
Pigeon guillemots remain abundant in Puget Sound. They are an important indicator of overall ecological health because, as generalists, they forage on a wide range of food across a variety of habitats.

TRENDS

Scoters: Puget Sound once attracted some of the largest wintering scoter populations on the West Coast. But since 1995, scoter populations have declined by more than half, from about 70 birds per square kilometer to a low of 35 birds per square kilometer in 2003.

Grebes: Western grebes have steadily declined in Washington the past 15 years. The Christmas bird counts conducted by Audubon Washington tracked more than 40,000 western

FIGURE 8-25 Densities of marine birds in north Puget Sound 1997-2006



grebes in western Washington in 1992. Recent tallies show only 7,500 grebes—a decline of 81 percent.

Pigeon guillemots: These are the second most abundant seabird found in Puget Sound. They do not appear to have declined as severely as surf scoters and western grebes, although only limited trend data exists on this species. Some reports by WWU indicate that pigeon guillemot populations increased by 20 percent since the 1970s, but more recent data from PSAMP suggest a stable or even modest decline. Repeating the 1999-2004 breeding surveys will give us more insight into the health of this bird population.

FIGURE 8-25: Three separate surveys of several marine birds in Puget Sound since the late 1970s indicate major declines in many of the species, most notably scoters, goldeneyes, long-tailed ducks and western grebes. Because many of Puget Sound's marine birds frequent the region for only part of the year, the causes of the decline are not understood. *Source: WDFW.*

PHOTO: (indicator) Pigeon guillemot. | Rae A. McNally.

The Action Team's work on **SPECIES**

What we said we would do

1. Complete and begin implementing recovery plans for listed salmon species.
2. Establish marine reserves and protect declining rockfish.
3. Conduct forage fish inventories along Puget Sound shorelines.
4. Implement orca recovery actions.

What's been done

1. Salmon and bull trout recovery plans.

- In June 2005, a draft of the Puget Sound chinook salmon recovery plan was submitted to NOAA Fisheries and the U.S. Fish and Wildlife Service (USFWS) for review and approval. The plan sets goals for achieving self-sustaining populations of Puget Sound chinook. Action Team agencies contributed to the effort through funding and staff support, WDFW Watershed Stewards helped developed local plans, and Action Team staff wrote the regional chapter on nearshore habitat. Implementation on the local and regional levels has begun.
- The Hood Canal Coordinating Council submitted the *Hood Canal/Eastern Strait of Juan de Fuca Summer Chum Salmon Recovery Plan* to NOAA Fisheries in October 2005; it is currently under review.
- USFWS issued the *Recovery Plan for the Coastal-Puget Sound Bull Trout* in 2006.
- Ecology developed a plan to monitor and assess statewide watershed health and salmon recovery, which will provide information on the physical, chemical and biological conditions of Washington's rivers and streams.
- Ecology continued its intensively monitored watershed (IMW) program to better understand the complex relationships between salmon health and habitat restoration efforts.

2. Making progress on forage fish inventories.

The NWSC reported that forage fish inventories were completed for the seven northern counties: Clallam, Jefferson, Snohomish, Island, Skagit, San Juan and Whatcom. State, tribal and salmon restoration Regional Fisheries Enhancement Groups conducted inventories in parts of Kitsap, Mason, Pierce, King and Thurston counties and in Hood Canal.

3. Protecting groundfish.

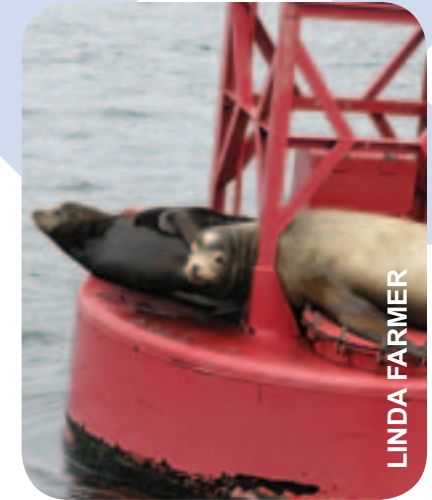
- In 2004, San Juan County officials declared the county a marine stewardship area and began to develop a community-based effort to address threats to marine resources. San Juan County has extensive rocky shoreline habitat used by groundfish.
- The Washington Fish and Wildlife Commission (WFWC) increased restrictions on groundfish harvest, including closing all harvest in Hood Canal until dissolved oxygen conditions improve. In the broader Sound, WDFW limited the rockfish season, prohibited the taking of canary and yelloweye rockfish, and in most areas required fishers to keep the first rockfish caught.

4. Conserving and recovering orca.

- In November 2005, NOAA Fisheries Service listed the southern resident killer whale as endangered under the federal Endangered Species Act. In June 2006, the agency announced its proposed critical habitat for this important species.
- NOAA Fisheries issued a draft Orca Conservation *Plan for Southern Resident Killer Whales* in 2005.

5. Habitat conservation plan for state-owned aquatic lands.

DNR continued development of a habitat conservation plan for 2.4 million acres of state-owned aquatic lands, including all the bedland areas of Puget Sound and many of the tidelands, covering 21 endangered, at-risk or sensitive species.



LINDA FARMER



CORPS OF ENGINEERS

PHOTOS: (top to bottom) Seals on buoy in Colvos Passage. | Linda Farmer; Salmon fry. | Corps of Engineers.



NOAA



JENNIFER VANDERHOOF

PHOTOS: (top to bottom) Common murre. | NOAA; Pygmy rock crab. | Jennifer Vanderhoof.

Action needed on SPECIES

Puget Sound species are the ultimate indicators of the overall health and vitality of the Sound, and the declines we see reflect the declining health of the Sound itself. The status of species that are fished and hunted is also directly related to our stewardship and harvest choices.

Protecting the Sound's species requires that we understand and protect the integrity of the overall food web. This means we must effectively address pollution and habitat loss. We cannot save the species without saving Puget Sound.

Ensuring that we have balanced populations of indigenous plants and animals requires concerted, sustained action and focus. We need to:

- **Take actions already identified.** The most important thing we can do is to take the actions identified in existing recovery plans to protect the species that are at greatest risk.
- **Be more proactive.** Waiting until species are listed under the federal ESA as threatened or endangered can be detrimental. We need to develop management strategies when species begin to show serious declines but before they have reached the point where they are threatened or endangered.
- **Go beyond the species-by-species approach to conservation and recovery.** This approach can fail to address broader ecosystem needs. We must supplement species-by-species recovery planning with an ecosystem approach that addresses the stressors for many species. This approach will likely be more effective and long-lasting as well as more relevant and useful for resource managers, landowners, regulators and others working to protect and recover species.
- **Complete and implement habitat management and conservation plans.** We need to develop and implement these plans on a regional scale for all key habitat types, such as eelgrass.

- **Continue to improve our knowledge.** More information is needed about the life histories and environmental requirements of species in decline, especially those that are migratory or spend a portion of each year outside the region. To be more strategic in our recovery actions, we also need to improve our understanding of the interconnectedness of the food web and the ecosystem.