

9. RED SEA URCHIN

Overview of the Fishery

The commercial fishery for the red sea urchin, *Strongylocentrotus franciscanus*, has been one of California's most valuable fisheries for more than a decade. This fishery is relatively new, having developed over the last 30 years (Figure 9.1 and Table 9.1), and caters mainly to the Japanese export market. Archaeological evidence, however, suggests that sea urchins in California have been fished by coastal Native Americans for centuries.

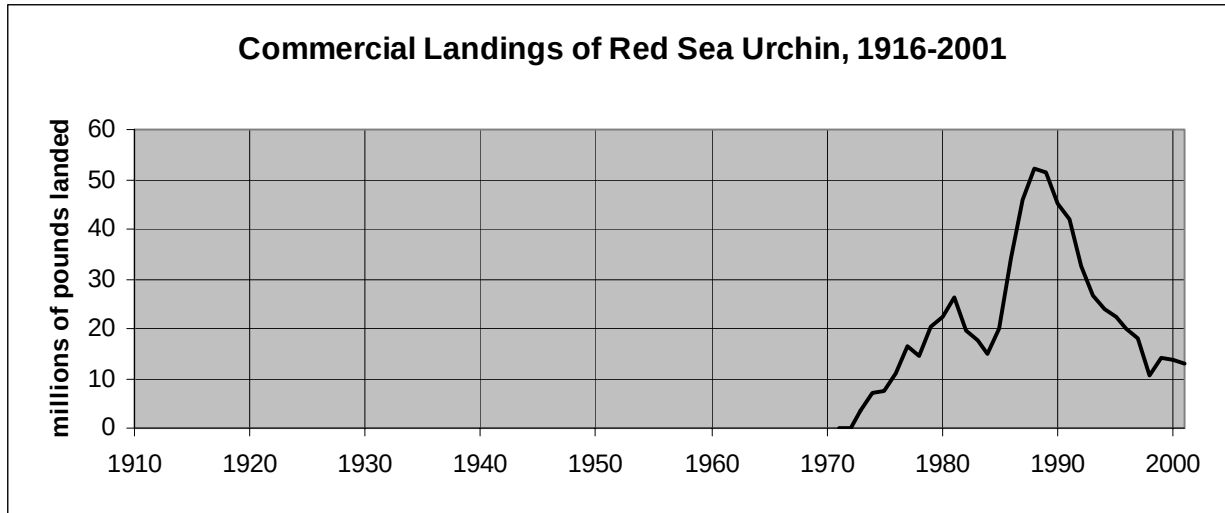


Figure 9.1. Annual commercial landings (pounds) of red sea urchin from 1916 to 2001. Data sources are the California Department of Fish and Game (DFG) Catch Bulletins (1916-1983) and the DFG commercial landing receipt database (1984-2001).

The gonads of both male and female urchin are the object of the fishery and are referred to as “roe”, or “uni” in Japanese. Sea urchins are collected by divers operating in near shore waters. Divers are size-selective, and check gonad quality while fishing to ensure marketability. The price paid to fishermen for gonads is based on quality. Gonads are graded by size, color, texture and firmness, all of which are affected by the urchin's stage of gonad development and food supply. Fishermen are paid less than \$0.20 to more than \$2.00 per lb for whole urchins, with the highest prices garnered during the Japanese New Year holidays.

In the last few years, the red urchin fishery has become fully exploited throughout its range in northern and southern California. Because of predation by sea otters, sea urchin stocks in central California occur at densities too low to sustain a commercial fishery. The purple sea urchin, *S. purpuratus*, which occurs over the same geographical range as the red sea urchin, is also harvested in California on a limited basis (see purple sea urchin status report).

Southern California Fishery

The fishery in southern California began in 1971 as part of a National Marine Fisheries Service program to develop fisheries for underutilized marine species. The

fishery was also seen as a way to curb the destructive grazing of sea urchins on giant kelp. Prices for southern California urchin are typically higher than for northern California urchin due to the longer market presence of the southern urchin, and consistently higher gonad quality (smaller size and sweeter taste).

There have been two periods of rapid fishery expansion, one in southern California and one in northern California. The first rapid expansion culminated in 1981 when landings peaked at 25 million lb in southern California (Figure 9.2). Fishermen entering the fishery from the declining commercial abalone fishery contributed to the rapid escalation of the urchin fishery. Sea urchin landings decreased following the El Niño event of 1982-1983 when warm water weakened or killed kelp, the primary food

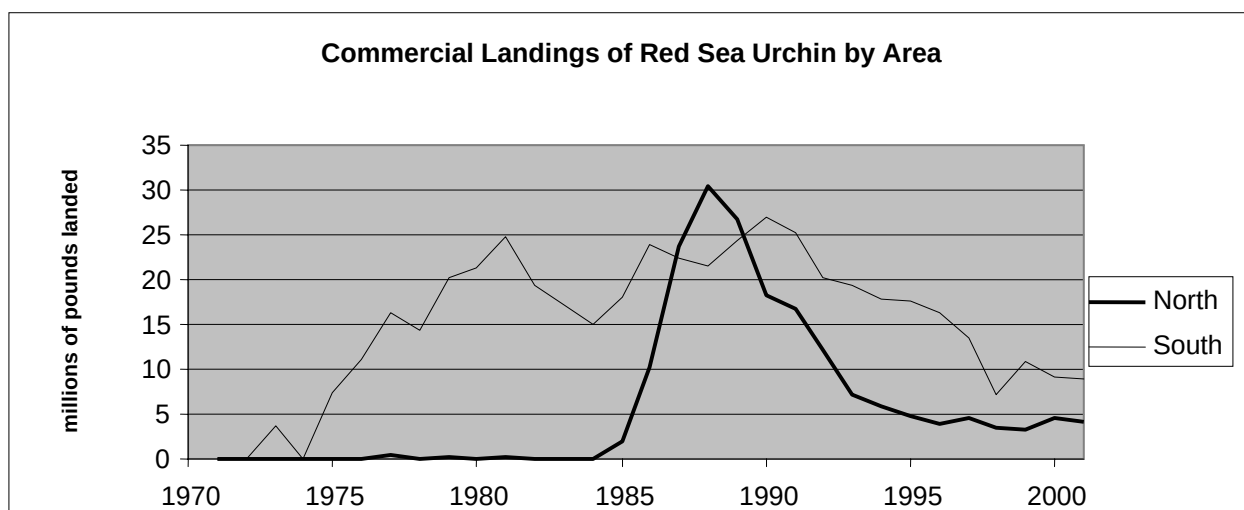


Figure 9.2. Annual commercial landings (pounds) of red sea urchin in northern California and southern California from 1971 to 2001. Data source is the California Department of Fish and Game (DFG) commercial landing receipt database.

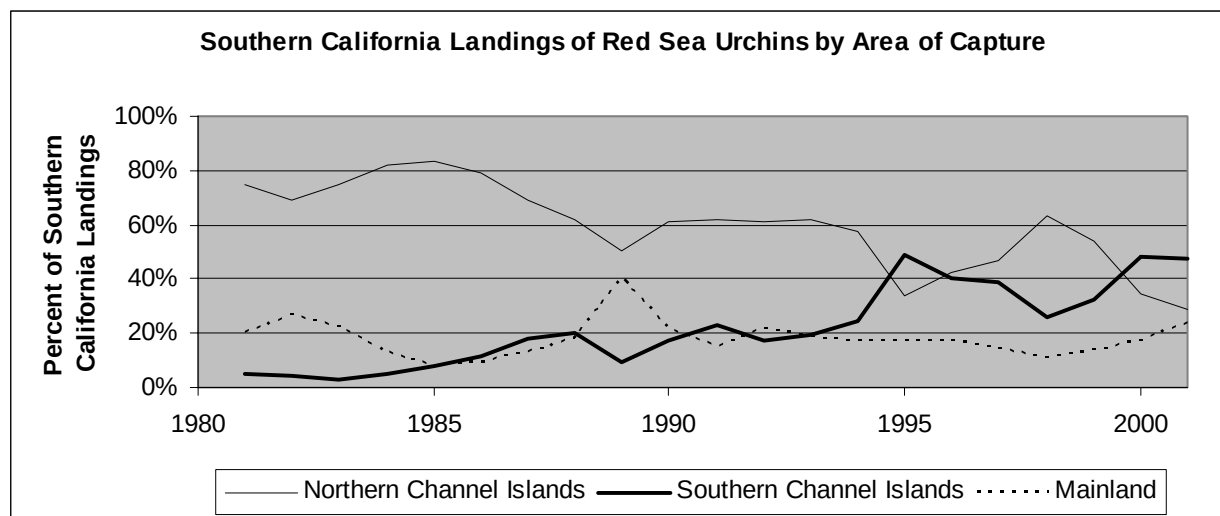


Figure 9.3. The proportion of commercial red sea urchin landings in southern California taken from the northern Channel Islands, southern Channel Islands, and mainland from 1981 to 2001. Data source is California Department of Fish and Game (DFG) commercial landing receipt database.

source for sea urchins. Landings did not recover until the 1985-1986 season, due in part to the strengthening of the Japanese yen relative to the US dollar, which gave California fishermen and exporters more economic incentives.

The majority of southern California sea urchin landings have come from the northern Channel Islands off Santa Barbara. This area, with its large, accessible stocks nurtured by lush kelp beds, supported the red sea urchin fishery in its early years. From 1973 to 1977, 80% to 90% of red urchin landings originated from these islands. Since the late 1990s, however, landings have decreased from the northern Channel Islands as fishing effort shifted south to San Clemente Island, San Nicolas Island, and the San Diego area (Figure 9.3). More recently, there has been a reported reversal of this trend as northern Channel Island kelp beds rebound from the 1997-1998 El Niño. These spatial shifts have been accompanied by catch decreases throughout the region (Figure 9.2). In 1990, the southern California sea urchin catch peaked at over 27 million lb; however, the catch has declined steadily to 8.8 million lb in 2001. In the 1990s, the fishery was impacted by two El Niño events (1992-1994 and 1997-1998) and a weakening Japanese economy that lowered demand and ex-vessel prices; both factors contributed to reduced fishing effort and catches.

Northern California Fishery

The northern California commercial sea urchin fishery began in 1972, and remained insignificant until 1977, when 386,000 lb were landed in the Fort Bragg region. The second major fishery expansion began in 1985 (Figure 9.2), fueled partly by decreasing landings in southern California and favorable monetary exchange rates. The large and unexploited sea urchin biomass in northern California sparked a “gold rush” as hundreds of new fishermen entered the unregulated fishery. In northern California (from Half Moon Bay in San Mateo County to Crescent City in Del Norte County) landings jumped from 1.9 million lb in 1985 to 30.5 million lb in 1988, far

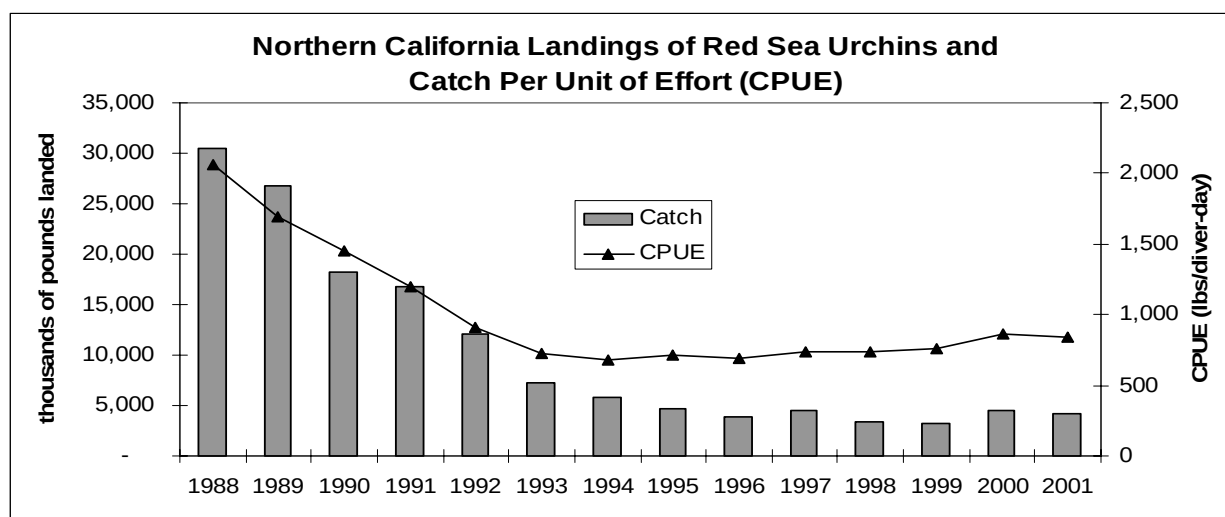


Figure 9.4. Comparison of northern California red sea urchin landings (pounds) and CPUE (pounds per diver-day) from 1988 to 2001. Data sources are California Department of Fish and Game (DFG) commercial landing receipt database (1988-2001) and sea urchin logbooks (1988-1992). There were no logbooks prior to 1988.

exceeding landings from southern California. Northern California sea urchin landings and catch per unit of effort (CPUE) began a steep decline in 1989. Landings leveled off in 1995 at about 3 to 4 million lb annually, and CPUE leveled off in 1993 at about 700 to 800 lb per fishing day (Figure 9.4). Landings data for 2001 show a catch of 4.1 million lb with fishermen earning \$3.9 million. In northern California, Fort Bragg has remained the center of the fishery, while the ports of Albion and Point Arena in Mendocino County and Bodega Bay in Marin County together account for about half of the catch. Rocky reefs around Crescent City also support a small fishery.

Management History

Responsibility for managing the sea urchin fishery originally lay with the California Legislature, but was delegated to the Fish and Game Commission (Commission) in 1973. In the early years of the fishery, management focused on reducing sea urchin densities to increase kelp abundance and urchin gonad yield. However, the rapid expansion of the fishery in the mid-1980s spawned a reassessment of this policy. In 1987, the Legislature established the Director's Sea Urchin Advisory Committee (DSUAC) which consisted of representatives from the fishing industry, California Department of Fish and Game (DFG), and California Sea Grant. DSUAC was the decision-making body for industry-funded research projects aimed at enhancing and managing the fishery, and acted as a forum for consensus-based management. In 2002, the self-imposed landing fee law that funded industry-backed research projects was repealed, and DSUAC was reformed through legislation as the Sea Urchin Fishery Advisory Committee. The new committee is charged with disbursing any remaining funds and advising DFG on management matters.

California's sea urchin fishery presently operates without a fishery management plan. Few restrictions have been placed on catch or effort until the late 1980s; the primary management measure prior to 1985 was limiting gear to rakes, airlifts and other hand appliances. Since then, principal management actions have consisted of the following:

- A moratorium on the issue of new permits in 1987, with a restricted access program beginning in 1989
- The introduction of a minimum legal size limit in 1988 (increased in northern California in 1990 and increased in southern California in 1992)
- Establishing a closed fishing season and restricting fishing to specific days. In 1990, northern California fishing was restricted to 233 days per year. In 1992, southern California fishing was restricted to 240 days per year
- An effort-reduction scheme was introduced in 1990 that presently requires 10 permits to be retired for each new entrant

All of these regulations remain in effect. The size limits and closures have been relatively ineffective in reducing total effort, with effort reductions in recent years due largely to a combination of diminished markets and declining urchin populations. While the limited entry program has created a slow but steady decrease in permits, it has probably not significantly reduced effort in the fishery.

Research that examines the feasibility of enhancing stocks by out-planting of juvenile sea urchins, funded primarily by the industry, has shown that out-planting is not cost effective given observed out-plant survival rates and the limited availability and high cost of juvenile urchins. Transplanting naturally occurring juvenile urchins from urchin dominated areas subject to high recruitment rates has shown some promise, however the utility of this strategy will depend on the availability of natural juvenile transplants, and recognition of the consequences of transplanting juvenile urchins into the surrounding ecosystem.

Restricted Access Program

The restricted access dive fishery for sea urchins began in 1989. Divers primarily harvest red sea urchins, although the smaller purple sea urchin is harvested sporadically.

The upper limit on the number of participants (the capacity goal) was originally set at 400 divers, but was later reduced to 300. The Commission placed a moratorium on the issuance of new permits in 1987. The number of permits increased dramatically before the moratorium became effective, with

<u>Historical timeline for the sea urchin restricted access program</u>	
1973	State Legislature delegates authority to the Fish and Game Commission for managing the sea urchin fishery.
1984	State Legislature authorizes a permit for the sea urchin fishery, but does not make it restricted access.
1986	State Legislature gives the Fish and Game Commission authority to limit the number of sea urchin diving permits.
1987	Fish and Game Commission places a moratorium on new permits.
1989	Restricted access program begins.

938 permits issued in the 1987 license year. Since then, the number of diving permits issued each year has generally declined (Figure 9.5). In 2001, there were 388 diving permittees, many of whom were not full-time divers.

The annual sea urchin diving permit is \$330, and is not transferable. There is an annual landing requirement (20 landings of 300 lb or more) for renewal of the permit. This provision is scheduled for repeal, effective in 2004. In addition, permit holders must submit logbooks that provide details on the location and depth fished, the number of hours spent diving, and the amount of urchins harvested. There is an annual urchin lottery to allow new participants to enter the fishery if any permits are available. Individuals may assist the diver on the vessel if they have a sea urchin crewmember permit (\$30).

State law (Fish and Game Code §7065) requires that each restricted access program be reviewed at least every five years for consistency with the Commission's policy on restricted access. Table 9.2 lists the Commission's restricted access policies

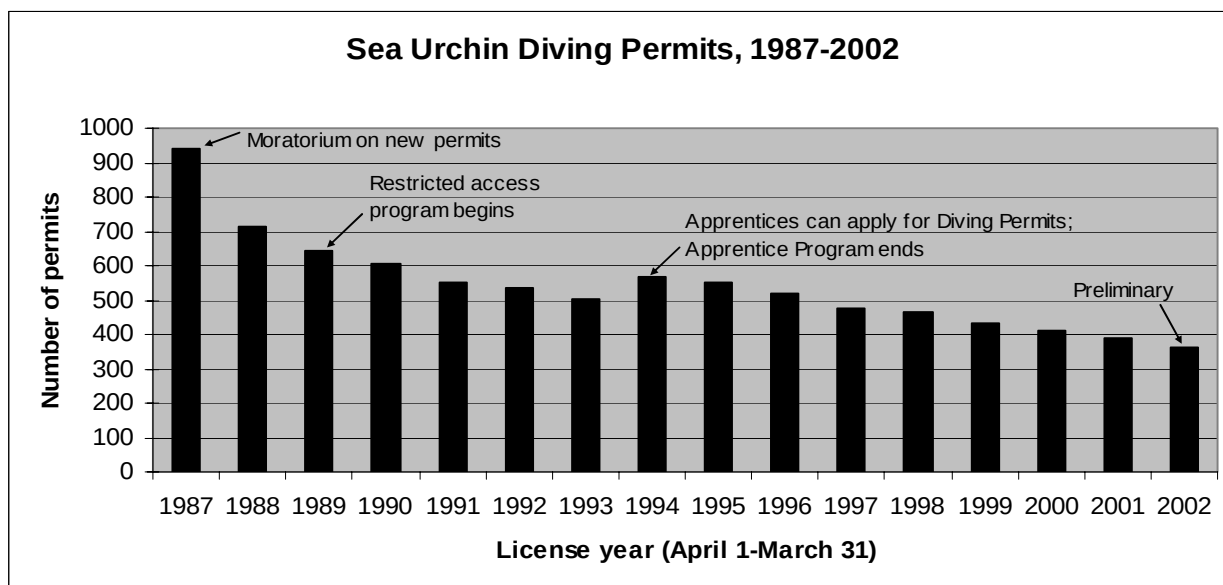


Figure 9.5. Number of sea urchin diving permits issued for the commercial red and purple sea urchin fisheries from the 1987-1988 license year (April 1 through March 31) to the 2002-2003 license year. The restricted access program began in 1989. The current capacity goal is 300 divers. Data sources are the California Department of Fish and Game (DFG) license reports.

and whether the sea urchin restricted access program is consistent with each policy. Even though the restricted access program began before the Commission adopted a policy on restricted access, the program is consistent with most of the Commission's policies. The main feature of the sea urchin restricted access program which is not consistent with the Commission's policies is issuance of new permits when the number of permits is above the capacity goal.

It is the policy of the Commission that each restricted access program must have an equitable and practicable system to reduce fishing capacity. Although constituent satisfaction with the system has not been measured, the system was developed with constituent input. It also provides a means for new participants to gain experience and enter the fishery, and for former permit holders to re-enter the fishery.

Status of Biological Knowledge

Sea urchins play an important ecological role in kelp forest communities. They are found subtidally along the California coast wherever conditions are favorable. Red sea urchins belong to the phylum Echinodermata, which includes sea stars, brittle stars, sea cucumbers, and sand dollars. These urchins have a hard shell called a "test", with spines and small pincers. Tube feet located between the spines are used in respiration, locomotion, and for grasping food and the substrate. The mouth, located at the base of the urchin, consists of five plates that make up a jaw structure commonly known as "Aristotle's lantern". The mouth leads to the digestive system, which voids through the anus on the top of the urchin.

Sea urchins are omnivorous, but mostly eat leafy algae. The perennial giant kelp is their preferred food in southern California, whereas in northern California urchins feed on the annual bull kelp and perennial brown algae. The red sea urchin's ability to survive during periods of food shortage contributes to its ability to persist in high

densities in areas devoid of algae, known as “urchin barrens”. Following oceanographic events such as El Niños, barrens occur in southern California wherever kelp beds die off, causing shortages of standing and drift algae. These food shortages may trigger urchins to aggregate and move in eating “fronts”, denuding the sea floor. Based on examination of long-term aerial photos and on kelp forest ecology studies in northern San Diego County, sea urchin grazing at its most severe probably accounts for about 20% of kelp mortality in a given kelp bed. Conversely, the intense fishery for red sea urchins in northern California appears to have had a positive effect on kelp availability. Aerial photographs of surface kelp at one location in northern California showed a 15-fold increase surface canopy from 1982 to 1989 during a period of concentrated urchin fishing.

Red sea urchins may compete with abalone for both space and food. A recent study on competitive interactions between these species at sites in northern California concluded that there is an inverse relationship between them that favors red sea urchin at sites where neither species is at low densities. Sea urchins may be more successful in competing for limited food because of their aggressive foraging and ability to survive starvation conditions. Fishing for abalone and sea urchins has no doubt altered these relationships.

Red sea urchins have many predators, including sea otters, spiny lobsters, sea stars, crabs, white sea urchins, and fishes such as California sheephead. Within the sea otter’s present range, the red sea urchin resource has been reduced to a level which precludes fishery utilization.

Urchin diseases have decimated the sea urchin populations of Caribbean islands; however, the dynamics of sea urchin diseases in California remains poorly understood. Sea urchins in southern California are especially susceptible to disease during warm-water El Niño events.

Sea urchin growth rates vary depending on food availability. Growth rates must be determined by tagging and recapturing. Internal tags (“PIT” tags), or chemical (fluorescent) tags that bind to calcium have been used to successfully tag sea urchins. Tagging studies reveal that red urchins are long-lived, with large individuals possibly living beyond 100 years. Growth to 3.5 in. (test diameter, exclusive of spines) takes an average of six to eight years. There are no discernable growth patterns along a latitudinal gradient from Baja California to Alaska; however, there is a clear trend in population mortality rates. Mortality estimates for southern populations were found to be greater than for northern populations. Likely mechanisms include higher rates of disease and temperature-related stresses in the south.

Red sea urchins become sexually mature at 2 in. test diameter. The sex ratio in urchins is about 1-to-1. Sea urchin spawning is seasonal, but can vary from year to year and from one locality to another. Food supply and ocean temperatures play roles in the timing and magnitude of spawning. In most southern California locations, spawning generally occurs in winter. In northern California, major spawning occurs in spring and summer, with some spawning activity also in December.

As with many marine invertebrates, fertilization is external and success is highly dependent on density. Subtidal studies suggest that red urchins at densities of less than two per square meter can have poor fertilization success. Females spawn up to several million eggs at a time. Larval development is dependent on temperature and

the abundance of phytoplankton (single-celled algae) and is thought to extend for six to eight weeks. As the larvae mature, they settle to the bottom and progress to the juvenile life-stage; however, they can spend a long time drifting with water currents before settling. This allows juvenile sea urchins to disperse long distances from the adults that spawned them.

Settlement patterns have been studied for red and purple sea urchins on artificial substrates at sites in northern and southern California since 1990. Peak settlement periods tend to be in spring and early summer although there is substantial year-to-year variation in timing and intensity. Settlement also tends to be less variable south of Point Conception, and is depressed during El Niño events. The more variable pattern of settlement in northern California is consistent with the more energetic offshore movement of water during spring periods when larvae are present, especially around headlands. Consequently, El Niño events appear to favor settlement in the north as offshore water movement becomes reduced. Recruitment patterns (that is, individuals reaching a specific life-stage such as legal size) of red sea urchins in northern and southern California generally mirror those of settlement. Recruitment in southern California appears to be relatively constant, while in the north recruitment rates are lower and more sporadic.

Newly settled juvenile urchins are very vulnerable. Juveniles are preyed upon more often in kelp forest habitat, where predators are presumably more abundant than in similar rocky habitats just outside of kelp beds. Adult sea urchins and their spines are important protective structures in subtidal communities. The canopy formed by the spines is a micro-habitat that shelters juvenile sea urchins, shrimps, crabs, brittle stars, fish, abalone, and other invertebrates. The spine canopy is most likely an important habitat for juvenile sea urchins, especially in areas where alternative cryptic habitats (such as crevices and undersides of boulders) are rare or absent.

Status of the Population

In southern California, the red sea urchin resource now produces less than 10 million lb annually, with harvestable stocks (stocks that exceed the minimum legal size and contain marketable gonads) in decline since 1990. Between 1985 and 1995, the percentage of legal-sized red sea urchins at survey sites in the northern Channel Islands declined from 15% to about 7%. Although fishing has significantly reduced density in many areas and CPUE has decreased, replacement of fished stocks by juvenile sea urchins has somewhat mitigated fishing pressure. Consistent settlement rates have been noted on artificial substrates and along subtidal transects over the last decade at monitoring stations along the southern California mainland coast and the northern Channel Islands. This may be partly due to ocean current patterns in the Southern California Bight, which may increase the chances for larvae to encounter suitable habitat for settlement. Continued recruitment at present levels, however, is not guaranteed.

The areas where sea urchins have been harvested in southern California have shifted over time. The northern Channel Islands have supplied most of the catch over the years, but beginning in 1995 catches in the northern Channel Islands began to decline, and effort and harvests started to increase off San Nicolas and San Clemente

Islands to the south, signaling a shift away from the northern Channel Islands (Figure 9.3).

The northern California fishery has been characterized by rapid increase in landings. Thirty million lb were landed in northern California in 1988, with a subsequent decline to less than 5 million lb in the late 1990s. Fishery-dependent modeling of the sea urchin fishery during the period of rapid decline estimated that the 117 million lb of red urchin harvested from 1988 through 1994 represented about 70% of the harvestable stock available in 1988. Effort declined during this period; the number of divers who worked exclusively in northern California declined from 126 in 1991 to 79 in 2000. Annual catch per permittee declined by 40% from 1990 to 2000.

Since 1988, low densities of harvestable stocks have been found at sub-tidal survey sites in the Fort Bragg area. From 1988 to 1997, the number of legal-sized red urchins outside of reserves declined from 47% to 20% of the population, while densities dropped from 0.8 urchins per square meter to 0.2 urchins per square meter. In contrast, densities in two Fort Bragg area reserves during this period averaged over 3.0 red urchins per square meter. These patterns continued during northern California surveys in 1999 and 2000. Episodic and infrequent recruitment combined with intensive harvesting on the north coast has caused the fishery to evolve into a “recruitment” fishery, with fishermen harvesting urchins as soon as they reach legal size (that is, harvesting newly-recruited sea urchins). In 1999 for example, 47% of the catch was less than 3.9 in. wide (test diameter), just over the 3.5 in. minimum size limit for northern California. The size limit and seasonal closures may help prevent fishery collapse, but may not improve recruitment, particularly if recruitment success is dependent on oceanographic factors, spine canopy micro-habitat and the presence of large spawners in the population.

Management Considerations

The Department and the industry have worked for more than a decade to adjust regulations for the red sea urchin fishery as needed. The red sea urchin fishery is fully exploited in California, and evidence from a variety of sources points to an over-fished condition in northern and portions of southern California. The following management activities should be considered to insure the health of the resource and fishery:

- Expand existing fishery-dependent and -independent monitoring programs, and expand collaborative monitoring and research with the industry
 - o Collect logbook data at a higher spatial resolution using Global Positioning System (GPS) technology
 - o Expand fishery-independent monitoring to allow managers to assess density, abundance of size classes, and poor quality urchins not sampled within the fishery (since the commercial fishery only targets certain sizes)
 - o Continue and expand the long-term monitoring of settlement patterns to provide a relative measure of settlement. Industry has funded the settlement work to date
- Develop a red sea urchin fishery management plan. The Marine Life Management Act Master Plan (*The Master Plan: A Guide for the Development of Fishery Management Plans*, August 2001) identified sea

- urchins as one of the three fisheries that most need a management plan
- Conduct a capacity goal analysis to evaluate whether the present goal (300 divers) matches the resource. Investigate equitable, practicable and enforceable methods for reducing fishing capacity
- Continue to examine and consider the use of spatial management techniques such as marine protected areas and rotating harvest zones

The following management measures could be implemented on an interim basis before a fishery management plan is in place:

- Evaluate current sea urchin size limits and the establishment of a maximum size limit (that is, a size above which no urchins may be taken). Current regulations prohibit the take of red sea urchins between 1.5 and 3.25 in. for southern California and between 1.5 and 3.5 in. for northern California
- Establish regional management zones for northern and southern California

Peter Kalvass and Laura Rogers-Bennett
California Department of Fish and Game

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by **Peter Kalvass**

Section on Restricted Access Program added December 2002
Kristine C. Barsky and Connie Ryan
California Department of Fish and Game

Further Reading

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Table 9.1. Commercial landings (pounds) of red sea urchin, 1916-2001									
Year	Pounds	Year	Pounds	Year	Pounds	Year	Pounds	Year	Pounds
1916	-----	1933	-----	1950	-----	1967	-----	1984	14,978,869
1917	-----	1934	-----	1951	-----	1968	-----	1985	19,994,868
1918	-----	1935	-----	1952	-----	1969	-----	1986	34,131,614
1919	-----	1936	-----	1953	-----	1970	-----	1987	46,061,649
1920	-----	1937	-----	1954	-----	1971	200	1988	51,987,990
1921	-----	1938	-----	1955	-----	1972	76,457	1989	51,200,303
1922	-----	1939	-----	1956	-----	1973	3,594,695	1990	45,266,911
1923	-----	1940	-----	1957	-----	1974	7,101,815	1991	41,945,432
1924	-----	1941	-----	1958	-----	1975	7,567,154	1992	32,366,557
1925	-----	1942	-----	1959	-----	1976	11,106,426	1993	26,852,646
1926	-----	1943	-----	1960	-----	1977	16,536,295	1994	23,770,707
1927	-----	1944	-----	1961	-----	1978	14,427,547	1995	22,260,967
1928	-----	1945	-----	1962	-----	1979	20,558,950	1996	20,066,110
1929	-----	1946	-----	1963	-----	1980	22,167,108	1997	18,020,775
1930	-----	1947	-----	1964	-----	1981	26,433,986	1998	10,555,177
1931	-----	1948	-----	1965	-----	1982	19,441,151	1999	14,178,359
1932	-----	1949	-----	1966	-----	1983	17,756,472	2000	13,902,110
								2001	13,068,469
----- Landings data not reported from 1916 to 1970. Fishery began in 1971. Data sources: DFG Catch Bulletins (1916-1983) and DFG commercial landing receipt database (1984-2001).									

Table 9.2. Consistency of the restricted access program for the sea urchin commercial fishery with the Fish and Game Commission policies on restricted access for commercial fisheries (policy adopted June 18, 1999)	
Fish and Game Commission policies	Sea urchin restricted access program's consistency with the policies
<i>Restricted access as a management tool</i>	
POLICY 1.1: The Fish and Game Commission (Commission) and the Department of Fish and Game (DFG) may use restricted access programs as one of a number of tools to conserve and manage fisheries as a public trust resource.	CONSISTENT The commercial restricted access program is one of the tools used to conserve and manage sea urchins. Other tools include: size limits and time and area closures.
<i>Goals and objectives of restricted access programs</i>	
POLICY 2.1: The Commission may develop restricted access programs for fisheries that retain the public ownership status of the resource for one or more of the following purposes: 1) to promote sustainability; 2) to create	CONSISTENT The State Legislature granted the Commission authority to limit the number of permits to prevent overfishing or to ensure efficient and economic

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Fish and Game Commission policies	Sea urchin restricted access program's consistency with the policies
an orderly fishery; 3) to promote conservation among fishery participants; 4) to maintain the long-term economic viability of fisheries.	operation of the fishery.
<i>Development and review of restricted access programs</i>	
POLICY 3.1: Restricted access programs shall be developed with the substantial involvement of participants in the affected fishery and others, consistent with the stakeholder participation requirements of Fish and Game Code §7059. This approach shall balance the specific needs of the fishery with the desirability of increasing uniformity among restricted access programs in order to reduce administrative complexity.	NOT APPLICABLE The program was developed before the adoption of this policy or the enactment of Fish and Game Code §7059. However, participants were involved in the development of the program and subsequent modifications to the program.
POLICY 3.2: Each restricted access program shall be reviewed at least every four years and, if appropriate, revised to ensure that it continues to meet the objectives of the State and the fishery participants. Review of each restricted access program shall occur at least as often as the particular fishery is reviewed in the annual fishery status report required by Fish and Game Code §7065. The general restricted access policy should be reviewed at a regularly scheduled Commission meeting at least once every four years following its adoption.	CONSISTENT IN PART • The program started before the adoption of this policy, but it has been modified and did receive some review by the Commission, DFG and stakeholders during those modifications. • This report (<i>Annual Status of the Fisheries Report</i> required by Fish and Game Code §7065) briefly reviews the program, but does not formally measure participants' perceptions on whether the program is meeting its goals and objectives.
<i>Elements of restricted access programs</i>	
POLICY 4.1: Each new restricted access program shall be based either on one or more species or species groups targeted by the fishery or on a type of gear. In programs based on a type of gear an endorsement may be required for one or more species or species groups targeted by the gear type. Each restricted access program should take into account possible impacts of the program on other fisheries.	CONSISTENT IN PART • The program is based on a species group (red and purple sea urchins). • It is not clear whether the impacts on other fisheries were evaluated during the development of the program.
POLICY 4.2: Each restricted access program that is not based on harvest rights shall have a capacity goal. The Commission, Department and stakeholders will use the best available biological and economic information in determining each capacity goal.	CONSISTENT The capacity goal is currently set at 300 sea urchin diving permits.
POLICY 4.3: Each restricted access fishery system shall have an equitable, practicable, and enforceable system for reducing fishing capacity when the fishery is exceeding its participation goal and for increasing fishing capacity when the fishery is below its fishery capacity goal.	CONSISTENT Systems exist for reducing and increasing capacity. Attrition is the means of reducing capacity. Capacity is increased by the issuance of new permits to eligible applicants. If there are more eligible applicants than new permits available, then a drawing is held to determine which applicants will be able to purchase permits.
POLICY 4.4: In fisheries that exceed their fishery capacity goals, permit transfers will be allowed only if they are consistent with the means for achieving the fishery capacity goal.	CONSISTENT Permits are not transferable.

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Fish and Game Commission policies	Sea urchin restricted access program's consistency with the policies
<i>Permits</i>	
POLICY 5.1: The Commission will give adequate public notice of intent to establish a restricted access program. The Commission may set a Control Date for determining qualification for a restricted access program. A new restricted access program shall not allow fishing effort to increase beyond recent levels. Some level of fishery participation may be required to qualify for an initial permit. Fishery qualification can be based upon fishery participation during a period of time preceding notification of intent or on other factors relevant to the particular fishery. Affidavits of fishery participation or medical statements of inability to meet qualification standards shall not be accepted. Vessels under construction or inoperable during the qualification period shall not be considered for a permit.	NOT APPLICABLE The program was developed before the adoption of this policy.
POLICY 5.2: New permits in a restricted access fishery shall only be issued when the fishery is below its fishery capacity goal.	NOT CONSISTENT New sea urchin diving permits are issued when the fishery is above the capacity goal. The number of new permits available for issuance is one-tenth the difference between the number of sea urchin diving permits issued prior to August 1 of the current license year and the number of permits issued the immediately preceding license year.
POLICY 5.3: Restricted access fishery permits shall be of one year duration and are renewed upon annual application and payment of the permit fee and shall be valid, provided they are annually renewed and the permit holder meets the requirements of the restricted access program for the life of the program.	CONSISTENT The permit must be renewed annually; the permittee must meet a minimum landing requirement, and must pay a permit fee.
POLICY 5.4: Each fisherman-based program shall determine in what circumstances, if any, a substitute may fish the permit.	CONSISTENT The program provides for a substitute if a diver becomes physically unable to dive because of long-term or permanent injury or disease.
<i>Permit transfers</i>	
POLICY 6.1: Restricted access permits may be transferable. In fisheries in which the permit is transferable, transfer may be subject to conditions that contribute to the objectives of the restricted access program. In new restricted access programs, permit transfers will not be allowed unless a fishery capacity goal and a system for achieving that goal are part of the restricted access program. In existing restricted access programs, the objective is to review and revise those programs to include fishery capacity goals and systems to achieve those goals. A restricted access program may include a fee on the transfer of permits, in excess of actual administrative costs for the permit change, to offset other costs involved in the conservation and management of that fishery.	NOT APPLICABLE Permits are not transferable.

Table 9.2. Consistency of the restricted access program for the sea urchin commercial fishery with the Fish and Game Commission policies on restricted access for commercial fisheries (policy adopted June 18, 1999)

Fish and Game Commission policies	Sea urchin restricted access program's consistency with the policies
<i>Vessel issues</i>	
POLICY 7.1: Vessels requested to be retired by the vessel owner will no longer be eligible to participate in commercial fisheries in California.	NOT APPLICABLE The permit is not vessel-based.
POLICY 7.2: Replacement vessels of the same or lower fishing capacity as the permitted vessel will be allowed only if the permitted vessel is lost, stolen, retired or no longer able to participate as a commercial fishing vessel.	NOT APPLICABLE The permit is not vessel-based.
POLICY 7.3: Each restricted access program that allows for vessel permit transfers may allow for vessel upgrades provided a permit consolidation/vessel retirement process consistent with the fishery capacity goal is made part of the program.	NOT APPLICABLE The permit is not vessel-based.
POLICY 7.4: A restricted access program may prohibit the use of support vessels or require that they be permitted in the fishery or that they pay a fee comparable to the permit fee.	NOT APPLICABLE The permit is not vessel-based.
<i>Harvest rights</i>	
POLICY 8.1: It is the policy of the Commission that harvest rights systems such as individual transferable quotas may be considered only after careful consideration of stakeholder input. In establishing such management systems, the State should consider: (1) fair and equitable initial allocation of quota shares which considers past participation in the fishery, (2) resource assessment for establishing total allowable catch estimates, (3) fishery participation goals and aggregation limits, (4) cost recovery from quota owners, (5) quota transferability, and (6) recreational fisheries issues.	NOT APPLICABLE The program is not based on harvest rights.
<i>Administration of restricted access programs</i>	
POLICY 9.1: Administrative costs shall be minimized and those costs shall be borne by the respective programs. Review or advisory boards may be considered on a program-by-program basis. The programs shall be administered in their entirety within an existing department unit.	CONSISTENT • The DFG License and Revenue Branch issues the permits. • The DFG Director's Sea Urchin Advisory Committee advised DFG for many years; it was recently restructured and is called the Sea Urchin Fishery Advisory Committee.
POLICY 9.2: Fees collected from restricted access initiatives may, for cost accounting and reporting purposes, be deposited in a single dedicated Restricted Access Fishery Account within the Fish and Game Preservation Fund. A fund condition and activity report should be published annually.	CONSISTENT The State Legislature, at the request of industry, created a landing fee specifically for sea urchin enhancement, research and management. That fee was repealed in 2002.
POLICY 9.3: Restricted access programs should provide specific disincentives for violations of pertinent laws and regulations. Enforcement costs of restricted access programs should be minimized through the use of new technologies or other means.	CONSISTENT The Commission can suspend, revoke or cancel a permit if the permittee or his employee or agent violates any regulation regarding sea urchins or abalone.