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# NETTING THE



A survey team times the surf at Belmont Shore as they start their watery journey to a predetermined location, towing the equipment-laden raft behind them. Before returning to the beach, the team must deploy a massive net and drape it beneath the surface so that it can be dragged ashore. The net collects hundreds of fish that are part of a study to determine how many species live in the shallow surf zone.

# Under the Surface

# NEARSHORE



# NEARSHORE

Comprehensive survey on species in shallow surf zone is first taken in six decades

**DIGGING THEIR FEET INTO THE SAND,** a handful of Department of Fish and Game marine biologists calculate the waves crashing along the southern California beach on a chilly November morning. They consider the best point of entry as they check rip currents and take note of the wind and swell direction. "When we do take that first plunge in the morning, it can be a rude awakening!" says Christi Linardich, a marine biologist working for DFG's Marine Region. Surrendering to the inevitable, the team load a large sampling net onto a raft and then race across the beach and into the shore break. Lunging through the surf, they push the raft beyond the waves, away from the possibility of capsizing. Once they reach the specified distance from shore, members drag the net off and float it in position. One of the swimmers pushes the raft back toward shore as the others pay out ropes from either side of the net. When everything is in place they turn and start the lengthy swim back.

Photograph © Tom Schabow

Story by Heather Gliniak



Photograph © Tom Schabow



Photograph © Al Orlitz



DFG Photo by Christi Linarditch

**Top:** Biologists wet their hands before handling the fish so the abrasiveness of their dry skin does not strip the fish's protective mucus coating. **Center:** A Belmont Shore seine brings in mainly Pacific barracuda. **Bottom:** A bright yellow tag is inserted on the spotfin croaker's left side just below the dorsal fin. Information from recaptured fish will help determine the seasonal and annual movement patterns of these fish.

A few yards down the beach, two anglers fishing the surf have watched as the biologists conduct the business of setting the net. Meanwhile, DFG volunteers on shore set up a data station with measuring boards, buckets and tagging guns. They bring out extra tags and clipboards filled with datasheets and pencils.

Using a net to catch fish in the shallow surf zone is one of the methods used by biologists to monitor nearshore fish populations. DFG generally defines nearshore waters as the part that extends out a nautical mile from the shore. The same definition applies to offshore rocks and islands.

"Although the Department gathers a lot of information from commercial and recreational fishermen to help set fishing rules and sustain fish populations, it doesn't tell the whole story," says Chuck Valle, a senior biologist with DFG's Marine Region. "We also need information you can't get from fishermen, so we directly sample the nearshore environment."

Field researchers collect data on ecosystems and species populations that become part of the equation to help formulate fishing regulations—the cornerstone of marine fisheries management.

### What's the catch?

With everyone back on dry sand, team members tow at the heavy ropes and reclaim the net and its contents. As they drag it ashore, the two anglers who have been watching wander over to see what the biologists have caught.

The haul yields a barred surfperch, large enough to tag, 10-yellowfin croakers less than a year old, a pair of topsmelt and a spotfin croaker. Researchers work quickly to transfer the wiggling fish to tubs filled with water. They record the species and the length of each catch before returning them to the waves. They document water temperature, ocean conditions and light intensity, and use a global positioning system that logs the location where the seine came ashore.

"The last comprehensive survey of the southern California surf assemblage was conducted by the Department in the 1950s," says Larry Allen, director of the Southern California Marine Institute and a biology professor at California State University, Northridge. "Considering 80 percent of our southern California coastline consists of sandy beaches and shore-based fishing has increased over the last 10 years, it is critical that new surveys are undertaken to update our knowledge of this important group of fish."

To help fill the information gaps in the status and trends of fish populations in the shallow surf zone environment, DFG biologists began in the summer of 2007 to conduct monthly beach seines at four sandy beaches in southern California. The information collected proved crucial for developing effective and responsive fishery management.



# Under the Surface

It takes the team 10 minutes to pull the net to shore a second time. They examine the seine, making sure not to miss anything buried under sand, and find a pair of topsmelt, a relative of the California grunion and a member of the silversides family. While the fish do not make for an exciting catch, they do make for an easy haul. Sometimes the returning net can hold hundreds—even thousands—of fish. Such a huge return makes for an extremely heavy net and can take a long time to process. On such days, the biologists measure only a sub-sample of every species and then count the rest. The strategy minimizes handling time and helps increase chances for survival after release.

Sampling days consist of four separate hauls, each taken a couple hundred yards from the previous point. While the first two hauls carried few fish, typical of the southern California sandy beach habitat, the third haul turned up something unusual.



DFG Photo by Erica Jarvis



**Biologists using a seining net off Seal Beach made a surprising catch, top photo, a juvenile Mexican lookdown, a rare catch for that area. Bottom: As they haul in the 100-foot-long net, surveyors are able to close off any escape route for the fish. The net is designed with floats that glide it just under the surface of the waves until it's drawn ashore.**

## Something exciting

"Look at this!" exclaims Erica Jarvis, one of the biologists. In addition to a handful of topsmelt and one jacksmelt, the net contains something that looks like it belongs in a tropical fish tank. Excited, the biologists gather around to examine the strange fish. It is something they have never seen locally.

Realizing the rarity of the find, they set the fish aside in a bucket of seawater until they have completed the final haul. This time, the net has snagged

only a single fish. Still, it's identical to the earlier exotic fish, only smaller.

Back at the lab, the biologists consult identification books and contact a local expert to confirm that what they found is a Mexican lookdown. A rarity for this part of the coast, the Mexican lookdown (*Selene brevoortii*) normally remains between Panama and the southern tip of Baja California. Marked with iridescent blue highlights, the silver specimen is flat, thin and nearly as round as a pancake. The fins

placed low on the body toward the tail are relatively large with black tips. The most discerning feature, however, is how the first dorsal fin has two long spines suspended like thin, black ribbons above the fish.

The discovery identifies Seal Beach as the northernmost location ever recorded for Mexican lookdown, by nearly 95 miles. Based on the size of the fish, the find represents the first occurrence of fish this young off California shores. The discovery so far north suggests that Mexican lookdown

larvae may be settling in southern California. Exactly where they are coming from is yet unknown. The two juvenile fish are now part of the fish collection at the Los Angeles County Museum of Natural History.

## Tags provide information

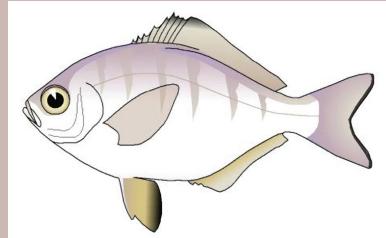
Although researchers collect information on all the fish they capture, they target five species of surf fish because of their popularity with anglers. The targeted group includes the barred surfperch, walleye

# Common Surf Fish Species of Southern California

## WALLEYE SURFPERCH

Walleye surfperch are found from Vancouver Island to central Baja California, Mexico, including Guadalupe Island. They are found in the surf zone along sandy beaches and rock formations; often in dense schools in up to 60 feet of water. They feed on small crustaceans and can grow to 12 inches in length. They are one of the most common species caught off piers.

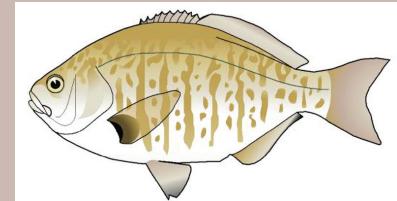
Identification: Body very compressed, with black tips on pelvic fins and a very large eye. Body silvery with faint duskiness on top.



## BARRED SURFPERCH

Barred surfperch range from Bodega Bay to off the coast of north-central Baja California, Mexico. They are found in small schools in the surf zone along sandy beaches and structures. They've been taken in waters as deep as 240 feet and can reach up to 17 inches and weigh 4.5 pounds. They feed on sand crabs, bean clams and other small crabs.

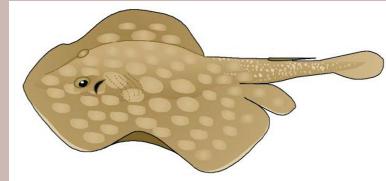
Identification: Body is oval and compressed with 8 to 10 rust-colored, irregular bars on sides with spots in between. Background color silver or white.



## ROUND STINGRAY

Round stingray range from Humboldt Bay to Panama. They are in bays and sloughs and over sand or mud bottoms along beaches in up to 70 feet of water. Large groups often gather just offshore of beaches where unsuspecting swimmers are stung when they step on them. The stinger is coated with a mucous membrane that usually causes pain and sometimes swelling and severe allergic reactions.

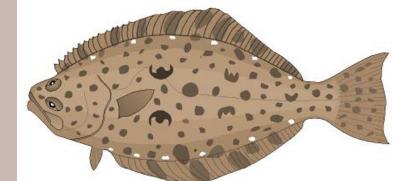
Identification: Round, disk-like body. Short tail has a stinger and a caudal fin. Body on top is usually a shaded brown with mottling or spots. The bottom can range from white to yellowish-orange.



## CALIFORNIA HALIBUT

California halibut are found from Washington to southern Baja California, from the shoreline to waters as deep as 600 feet. They occur most commonly in waters from 5 to 180 feet deep. They can reach 60 inches in length and live to be 30 years old. The young have an eye on each side of the head; adults may be right-eyed or left-eyed.

Identification: Flat fish with a large mouth, sharp teeth and both eyes on one side of the head. Lateral line makes a large arch over the pectoral fin.



surfperch, yellowfin croaker, spotfin croaker and California corbina. When biologists capture one of these fish, they insert a bright yellow tag just below the dorsal fin. Information from recaptured fish helps determine movement patterns.

Sometimes tagged fish find their way back into one of DFG's beach seines, but more often the information comes from surf anglers like Mike Romo. Romo recently caught a tagged yellowfin croaker at Bolsa Chica State Beach. The tag had a DFG phone number

and after calling and reporting the catch, he posted pictures on two fishing forum websites.

"My post got tons of hits and responses," says Romo. "Everyone was really excited about it and wanted to know what happens when you catch a tagged fish."

Before calling, anglers should write down the date and location where they caught the fish, its length and the tag number. In return for reporting a valid tag number, anglers receive a "Thank You" T-shirt along with informa-

tion about the movement of the tagged fish. Romo learned his yellowfin croaker had been caught and released once before, but had not traveled far from where it was originally tagged.

So far, researchers say most of the recaptured tagged fish have stayed relatively close, within a mile of the initial tagging location. Normal fishing regulations apply to tagged fish and anglers who catch and release a tagged fish should allow the tag to remain attached.

To date, DFG has com-

pleted nearly 400 hauls by net. Team members have measured nearly 31,000 fish and have tagged more than 3,000. The Marine Region expects to continue the environmental surveys of the shallow near-shore surf zone and continue to gather timely scientific information about this little understood ecosystem.



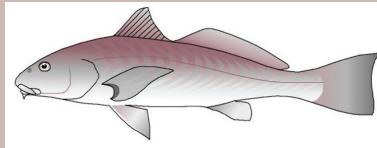
*Heather Gliniak is a marine biologist with Fisheries Independent/Scuba Assessment Project.*

*Illustrations by Larry Allen*

## CALIFORNIA CORBINA

California corbina occurs from Point Conception to the Gulf of California. They are found along sandy beaches and shallow bays, most commonly in 6 feet of water, but are known in depths of 45 feet. They can grow up to 30 inches in length and weigh up to 8.5 pounds. They feed on sand crabs, other crustaceans and clam siphons. Unlike other croakers, California corbina cannot make croaking sound because they lack an air bladder.

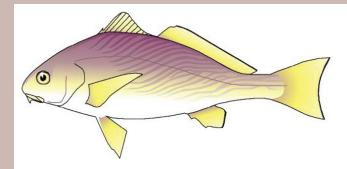
Identification: Slender croaker with a gray-to-bluish back and white, flattened body with wavy oblique lines on sides. Short, stiff chin barbel.



## YELLOWFIN CROAKER

Yellowfin croaker are found from Point Conception to the Gulf of California; fishing records from the 1800s report catches as far north as San Francisco Bay. They frequent shallow, sandy bottoms of the surf zone, bays and tidal sloughs in depths of around 25 feet, but are sometimes found in waters 150 feet deep. They can grow up to 20 inches and weigh 3.9 pounds. They feed on smaller fish, small crustaceans, worms and mollusks.

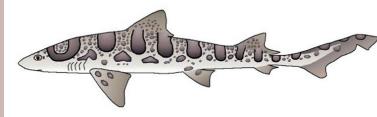
Identification: Long and elliptical body. Iridescent blue-to-gray color on top and white on bottom. Dark, wavy diagonal lines along back and sides. Single chin barbel. All fins except dark dorsal fins are yellowish in color.



## LEOPARD SHARK

Leopard shark range from Mazatlan, Mexico to the northern Gulf of California and northward to Oregon. They are most common in shallow waters, from the intertidal zone down to 15 feet, and favor muddy bays and sloughs. They can reach 49 inches in length and live to be 26 years old. Live-bearing female produces from seven to 36 pups annually.

Identification: Conspicuously covered with dark saddles and splotches. The top surface varies in coloration from silver to a bronzed gray. The belly is lighter and sometimes white.



## SPOTFIN CROAKER

Spotfin croaker range from Point Conception to southern Baja California. They are found along shallow, sandy beaches and bays, but sometimes occur in depths of up to 50 feet. They are usually in small schools near rocks and entrances to bays. They feed on clams, worms and small crustaceans. They can grow up to 27 inches and weigh up to 10.5 pounds.

Identification: Long body with a blunt snout and no barbel. Body is colored silvery to bluish gray above and white below but sometimes can be golden in color. They have dark, wavy lines on their sides and a large black spot at base of pectoral fin.

