## Can sonar identify salmon by species?

No, but we have non-sonar tools to help. To separate a run by species, we catch fish swimming past the sonar site using a fish wheel or by drifting test gillnets. We then analyze these catches to come up with a sort of salmon run recipe that might read something like one part Chinook to nine parts chum and three parts coho. The recipe can change from one day to the next, so we use regular catches to track the changes.

Don't you need to run sonar 24-hours a day to collect reliable data?

No. The difference in estimates generated while operating sonar 24-hours a day and estimates generated by sampling is very small. But the difference in operational costs is huge! Instead of operating sonar continually, sampling takes sonar snapshots throughout the day, which we then expand to represent 24-hours.

A sonar snapshot may last as long as three hours.

Sonar snapshots expanded to a 24-hour day
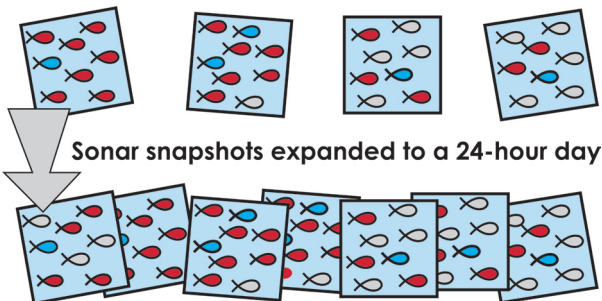
Sometimes several salmon species arrive in large numbers at the same time or we need to find a handful of Chinook among droves of chum.

**Chinook**   **Chum**   **Coho**

May → June → July → August
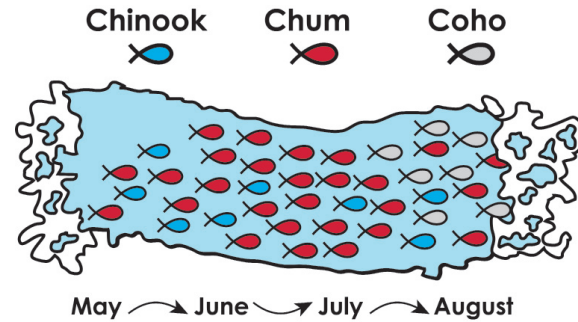
Can extreme turbidity disrupt sonar?

Yes. Just as snowstorms create whiteout conditions for snowmachines traveling by headlight at night, extreme turbidity during floods or ice break-up can blind sonar. When this occurs, remaining in-season data collected using fishing reports, fish wheels or test gillnets may be insufficient and conservative fisheries management strategies may be needed.
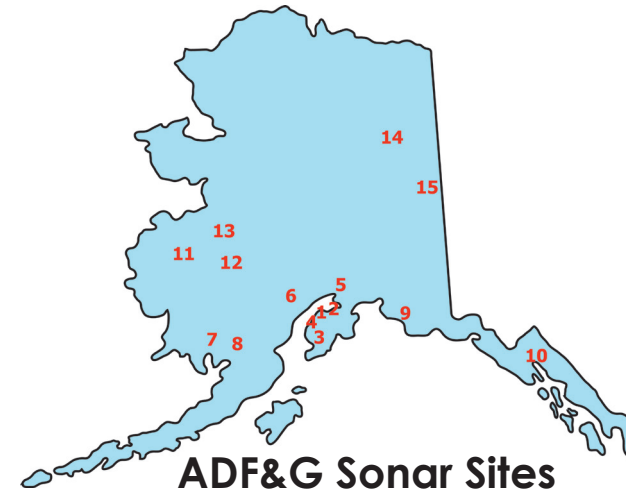
ADF&G Sonar Sites

1. Kenai (RM 8.6)	9. Copper
2. Kenai (RM 19)	10. Chilkat
3. Anchor	11. Yukon (Pilot)
4. Kasilof	12. Aniak
5. Yentna	13. Anvik
6. Crescent	14. Sheenjek
7. Nushagak	15. Yukon (Eagle)
8. Kvichak	

Arctic-Yukon-Kuskowim Region:

Alaska Fisheries Sonar

SONAR BASICS

Understanding Your State Fisheries Sonar Program
*The Arctic-Yukon-Kuskokwim Regional Series*

2011

Many Alaska salmon runs pulse into rivers cloaked behind turbid glacial melt water. To gauge salmon runs we can't see, we have taken a lesson from one of Mother Nature's fish-finding experts. In glacial silt-laden bays and rivers, beluga whales find salmon by emitting high-pitched calls and listening for returning echoes. Similarly, we have adopted sonar as a tool to detect salmon not by sight, but by sound.

Sonar is aimed into a river from either bank
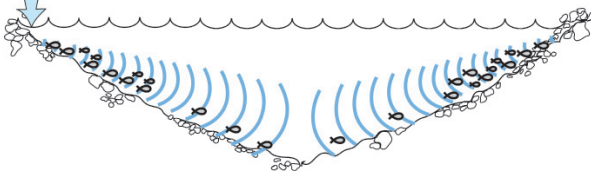
Sonar is a powerful tool for gathering immediate information on salmon run strength.

Sonar — Not Our Only Tool

A fisherman relies on many tools to maintain his outboard motor and we rely on many tools to make and adjust salmon run strength estimates—including non-sonar tools.

A Pilot Station sonar crew retrieves test gillnets. Crew drift the nets where the catch will best represent the fish detected by the sonar, rather than where the most fish can be caught.

TEST GILLNETS

## Salmon Data Collection Toolbox (*in-season*)

SONAR TOOLS

DIDSON
- Determines fish travel direction
- Detects fish within ~40 m of the sonar
- Can be used to calculate fish size
- Provides ultra-sound like fish video

Split-Beam
- Determines fish travel direction
- Detects fish within ~300 m of the sonar

NON-SONAR TOOLS

Test Gillnets &
- Provide catch rates as an indication of run strength at sonar sites

Fish Wheels
- Help biologists separate sonar-detected fish by species

Fishing Reports
- Includes information from test fisheries, such as the test fishery in Emmonak, and reports from fishermen.
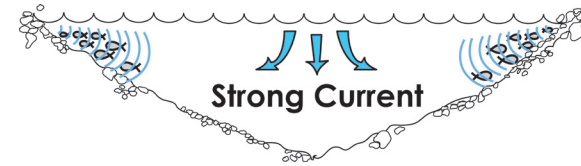
DIDSON records ultrasound-like video of fish. Split-beam sonar doesn't produce fish video, but can detect fish further from shore.
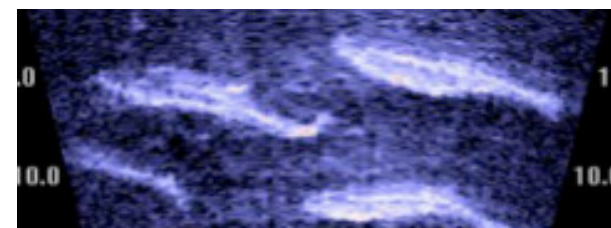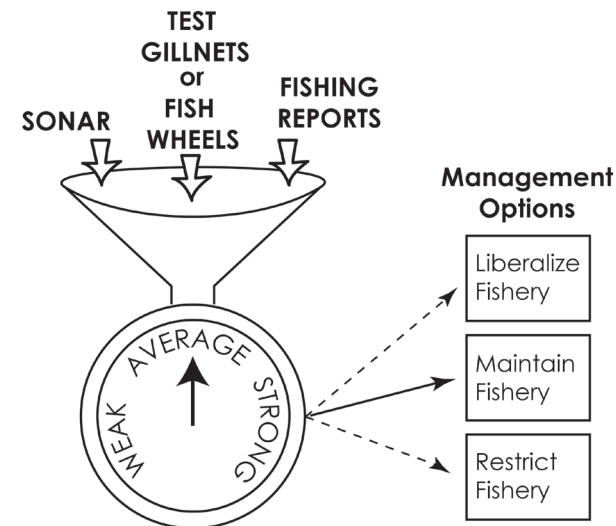

DIDSON (**D**ual frequency **ID**entification **SON**ar)

Can sonar miss salmon in the middle of large rivers?

Yes, but we locate our sonar sites where they should miss very few. When sonar does not cover the entire width of a river we will find a site where strong currents push salmon close to shore.

Strong Current

How it all comes together–

SONAR **TEST GILLNETS or FISH WHEELS** **FISHING REPORTS**

Management Options

WEAK AVERAGE STRONG

- Liberalize Fishery
- Maintain Fishery
- Restrict Fishery

Gauged Run Strength

A fish wheel catches salmon near a sonar site.

FISH WHEEL

Shouldn't you count every fish?

We do our best to detect and count every fish, but to make the most of limited program resources we focus on the crowd rather than the mavericks. It takes a great amount of effort to count every last fish and that means less effort put into getting an accurate estimate in areas where the vast bulk of the fish are. Even if we had greater resources, we would still get a better return on our investment by focusing those resources on areas where fish are concentrated.

Management for all users

Using sonar, test gillnets, fish wheels and fishing reports we can gather useful data without counting every fish. Instead of determining a precise fish number, the data help us gauge how strong or weak a salmon run is. Fisheries management also takes into account other sources of information such as genetics and forecasting data.

Arctic-Yukon-Kuskokwim Region Brochure Sonar Series: In the AYK region, ADF&G has five sonar sites on four rivers—the Yukon, Sheenjek, Anvik and Aniak Rivers. Please watch for our sonar site-specific brochures due to come out in spring and visit our Web site AlaskaFisheriesSonar.org

A technician analyses Split-beam sonar data at the Yukon River Pilot Station sonar site.

SPLIT-BEAM