

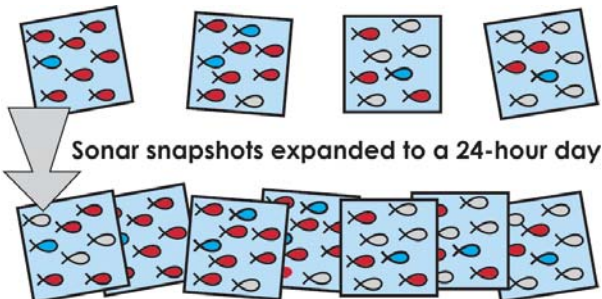
## Can sonar identify salmon by species?

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 sockeye and three parts coho. The recipe can change from one day to the next, so we analyze catches regularly to keep estimates updated.

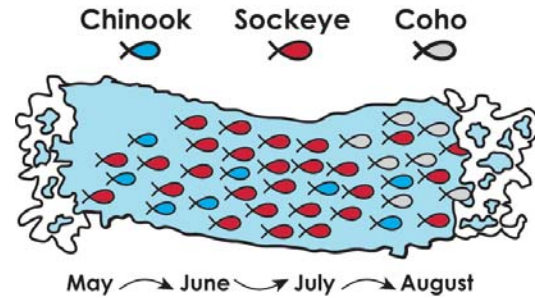
## Don't you need to run sonar continually to collect reliable data?

No. The difference in estimates generated while operating sonar continually 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 hourly, which we then expand to represent a full 24-hour period.

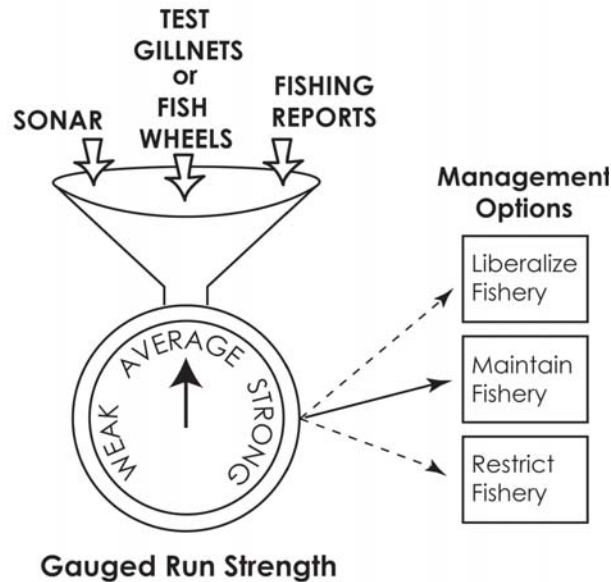
At Upper Cook Inlet sites, a sonar snapshot may last anywhere from 10 to 20 minutes.



*Sometimes several salmon species arrive in large numbers at the same time or we need to find a handful of Chinook among droves of sockeye.*

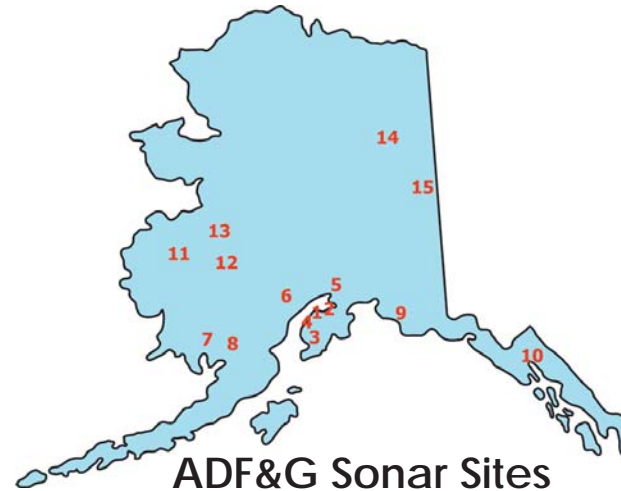


*How it all comes together—  
From data to management*



**Upper Cook Inlet Region Brochure Sonar Series:**  
The Upper Cook Inlet has five sonar sites on four rivers—the Kenai, Kaslof, Yentna and Crescent Rivers. Please watch for our sonar site-specific brochures due to come out this spring.

Have a question, comment or suggestion?  
Please contact us by phone,  
e-mail or snail mail.



### ADF&G Sonar Sites

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

### Upper Cook Inlet Region:



Alaska Department of  
Fish and Game

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# SONAR 101

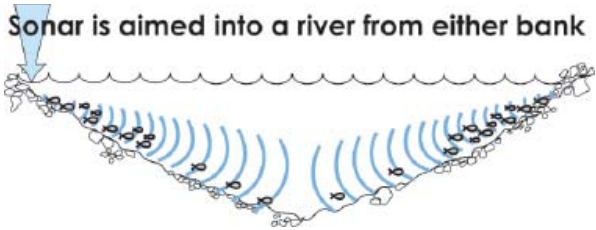
*Understanding Your State Fisheries Sonar Program  
The Upper Cook Inlet Regional Series*



2011



**M**any 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 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.



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 Chinook catch rates as an indication of run strength at Chinook sonar sites
  - Help biologists estimate the proportion of sonar-detected fish that are Chinook
- Fish Wheels**
- Help biologists estimate the proportion of sonar-detected fish that are sockeye
- Fishing\* Reports**
- Provide sport and commercial catch rates as an indication of run size
  - Provide age class information for arriving salmon that can be used as an indication of run size

\*Fishing Reports includes all reported commercial, sport and offshore test fisheries harvest data. Commercial data are collected with fish tickets and sport data with creel surveys.

A sockeye sonar site fish wheel catches Kasilof River salmon.



FISH WHEEL

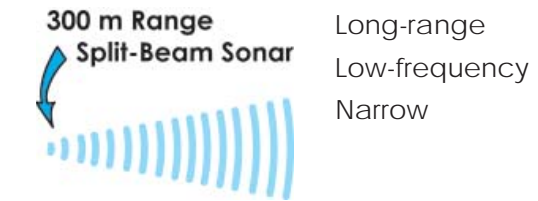
## Why are there two sonar sites on the Kenai River?

The Kenai River has a sockeye sonar site at River Mile 19 and a Chinook sonar site at River Mile 8.6. The need for separate sites is driven by differences in fish behavior and river conditions. Insonifying the entire width of the Kenai River is technologically difficult. For sockeye, we achieve better detection by choosing a site where strong currents push sockeye close to shore.

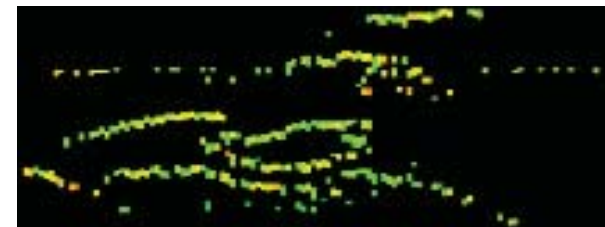


But in the Kenai we can't rely on currents to push Chinook close to shore. Instead, the Chinook site is located where conditions are best for deploying sonar technology that can cover the middle of the river. For more on this topic see our "Kenai Chinook Sonar" and "Kenai Sockeye Sonar" brochures or visit [AlaskaFisheriesSonar.org](http://AlaskaFisheriesSonar.org)

## Split-Beam (1990+)



Split-beam sonar records fish traces that require close analysis to estimate fish passage.



SPLIT-BEAM

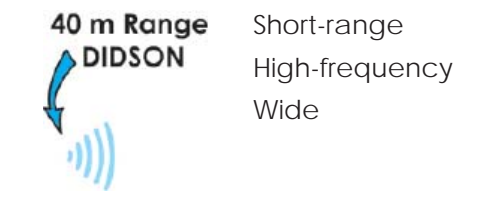
## Why don't you stop using split-beam sonar now that you have DIDSON?

DIDSON has many advantages over split-beam sonar, including better fish images and better detection along uneven riverbeds. But when it comes to range, split-beam sonar detects fish more than seven times as far as DIDSON. DIDSON ranges are improving. A new lens that nearly doubles DIDSON's range for high resolution imaging is being field-tested at the Kenai River Mile 8.6 Chinook sonar site. For more on this topic see our "Kenai Chinook Sonar" brochure or visit [AlaskaFisheriesSonar.org](http://AlaskaFisheriesSonar.org)

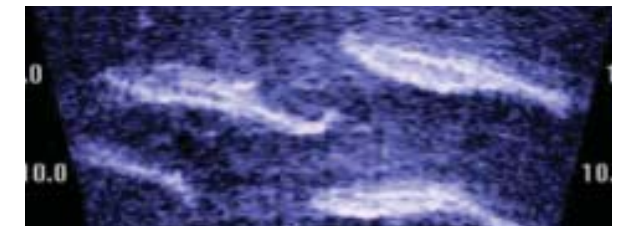


In the Upper Cook Inlet Region, split-beam is only used at the Kenai RM 8.6 sonar site. We mount the rectangular DIDSON and round split-beam transducers on the same tripod.

## DIDSON (2002+)



DIDSON's high-frequency sound waves record ultrasound-like video of fish that can be replayed.



DIDSON (Dual frequency IDentification SONar)