Operator's FishFinder Guide

Version 1.0

navtiX

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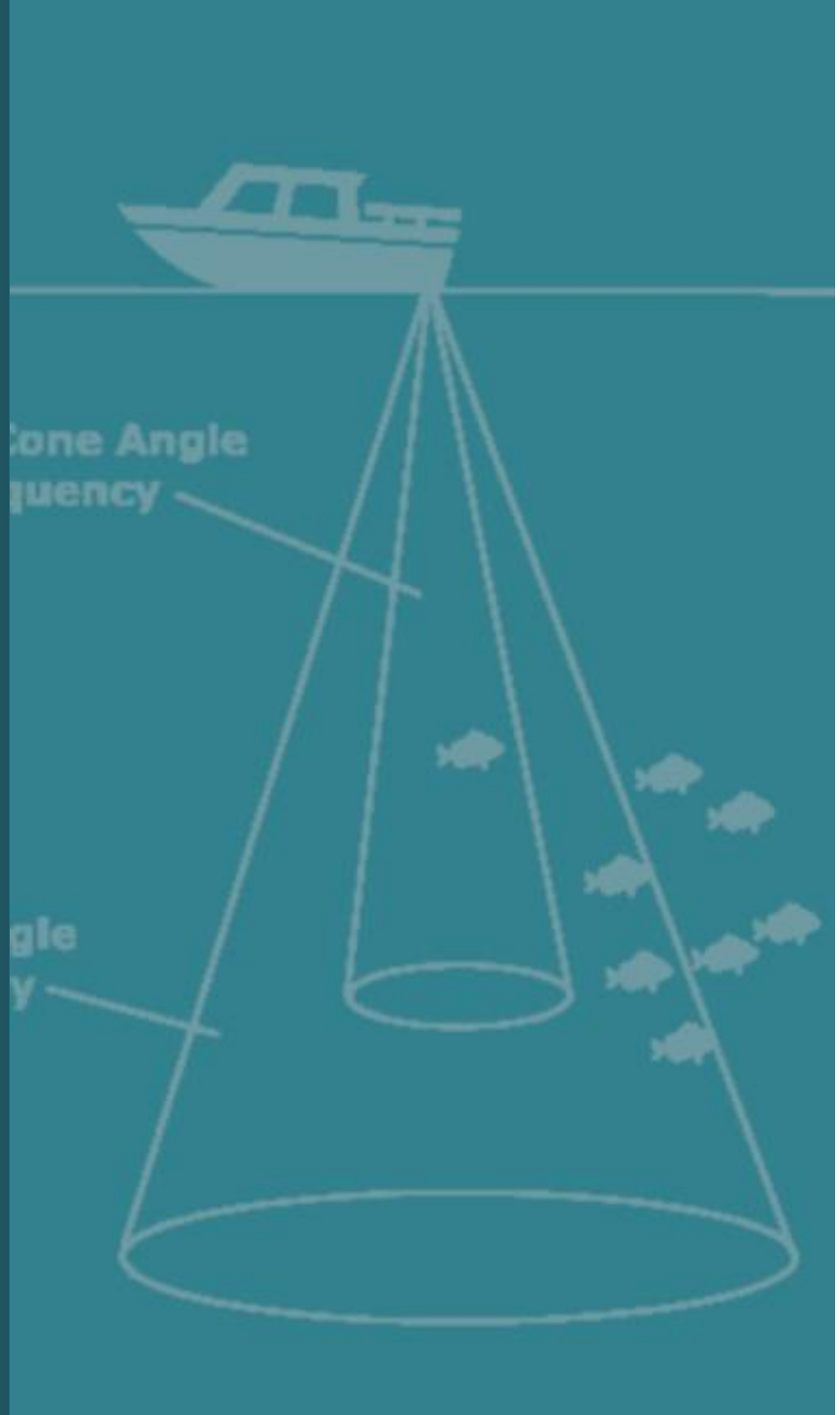
Principles



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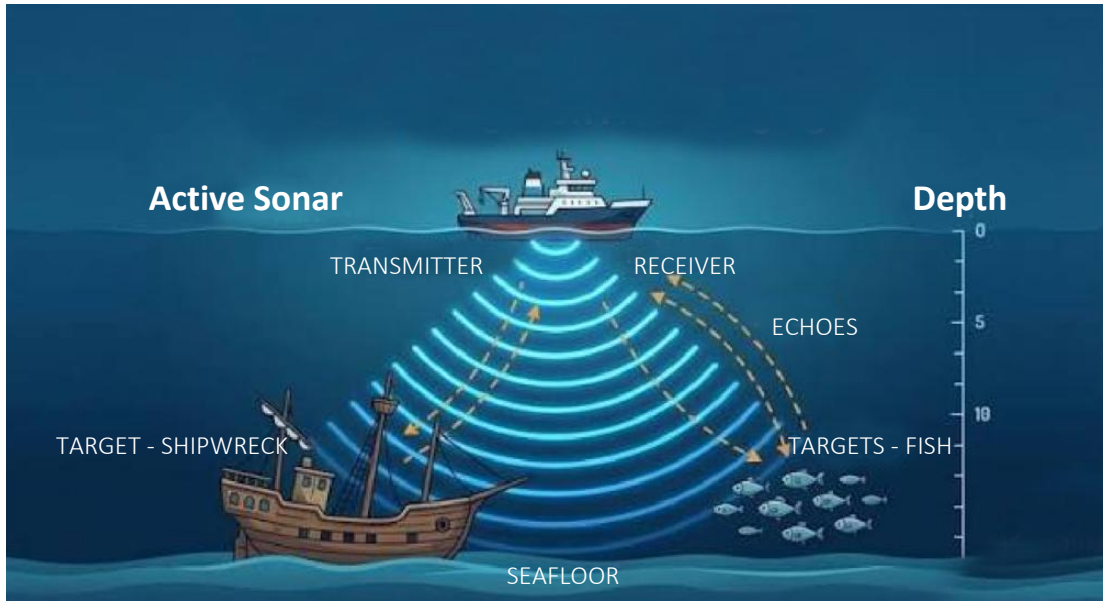
A fish finder uses sonar (Sound Navigation and Ranging). Its transducer sends sound pulses into the water and listens for echoes. When a pulse hits an object—like the lakebed, structure, or a fish—the sound bounces back. The device calculates distance based on how long the echo takes to return

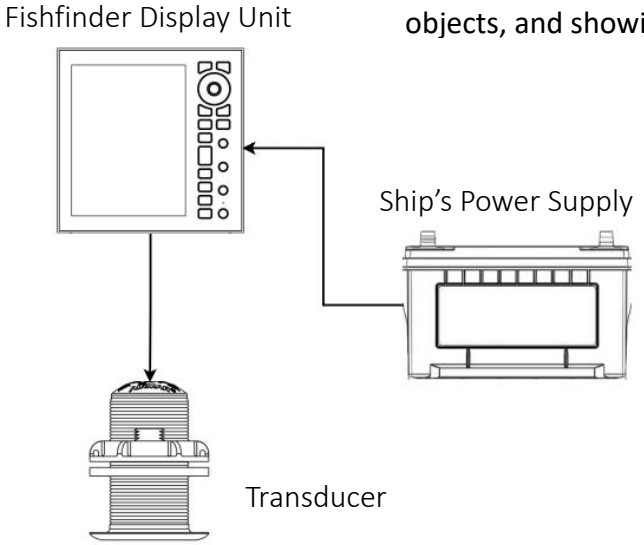


Core Components and Operation

- **Transducer:** Sends electrical energy turned into sound pulses (ultrasonic waves) straight down into the water and listens for returning echoes.
- **Echo Return:** Hard objects like rocks or the seabed bounce back strong signals; soft objects like mud or plankton give weak signals.
- **Depth Calculation:** Uses the constant speed of sound in water (about 1,500 meters per second) and travel time to compute how deep objects are

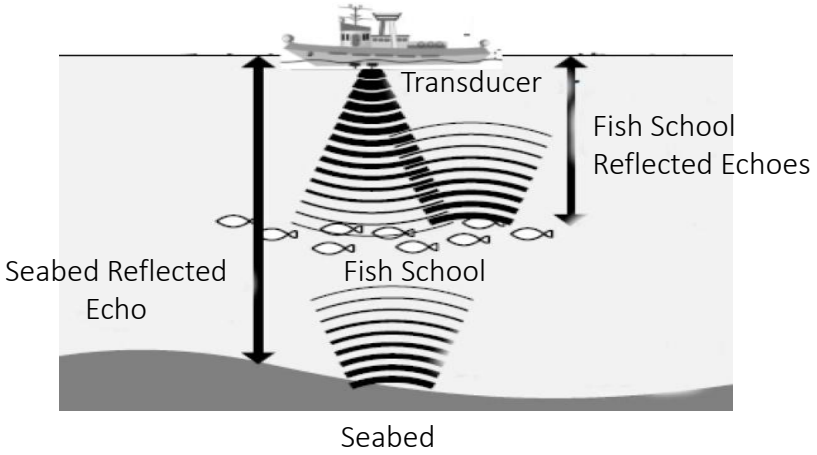
Principles | *How Fishfinder Work*

A fish finder works by sending sound waves into the water from a transducer, measuring how long those waves take to bounce back off objects, and showing the results as pictures on a screen. It relies on sonar technology—the same basic idea bats use to see in the dark.



The Main Parts

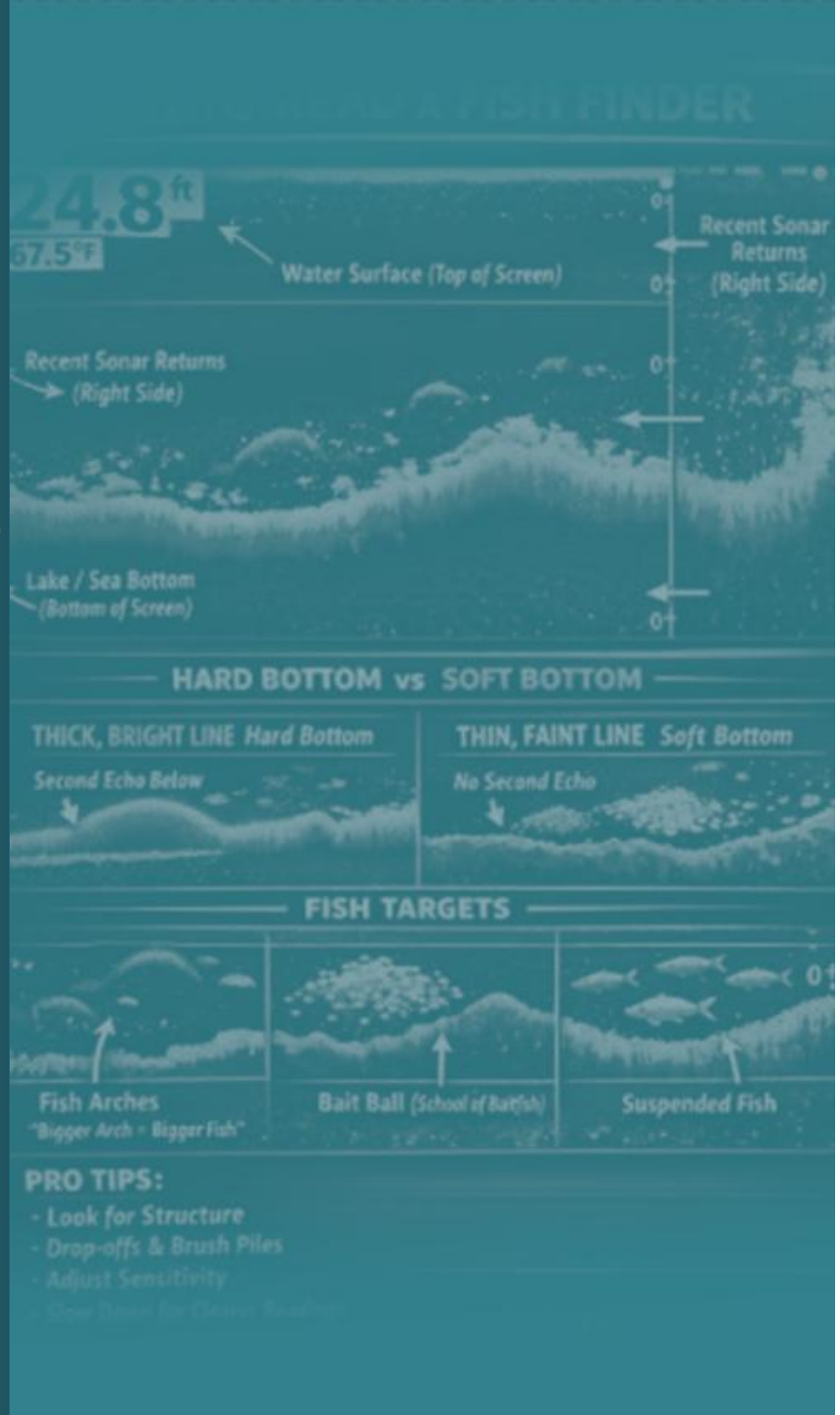
- **Transducer:** Sits underwater on the bottom or side of the boat. It turns electricity into sound pulses, then catches the returning echoes.
- **Head Unit:** The screen and computer on the boat. It translates the echo signals into colors, shapes, and depth charts you can read



How Sonar and Echoes Work

- **Sound Waves Down:** The transducer sends a cone-shaped pulse of sound straight down through the water.
- **Hitting Objects:** When the sound hits something dense—like a rock, the sea floor, or a fish—it bounces back up. Soft things like mud absorb more sound and give weak echoes.
- **Reading Fish:** Fish often show up as curved "arches" on the screen because the sound cone is wider at the bottom. As your boat moves over a fish, the distance from the edge of the cone to the fish and back changes, creating an arch shape

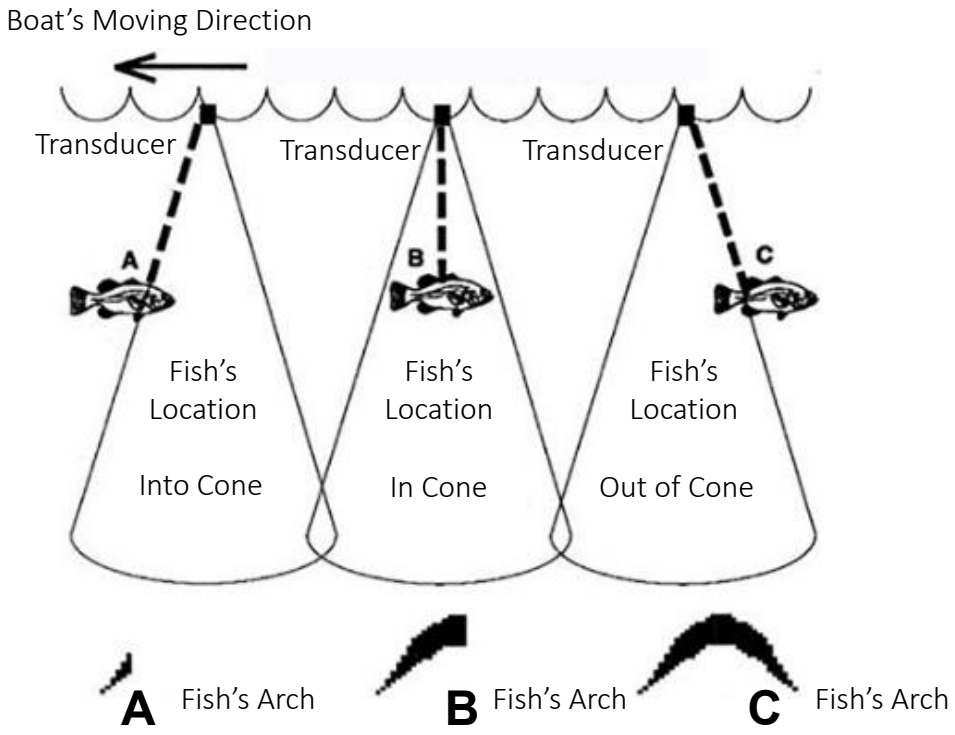
Terminology



- **Fish's Arch**
- **Frequency, Pulse Length & Ping Rate**
- **A-Scope**
- **Bottom Lock**
- **White Line**
- **TVG**
- **Echo Stretch & Filter Width**

Terminolgy | *Fishfinder's Fish Arch Echoes*

Fish appear as arches on a fish finder because the transducer emits a cone-shaped sonar beam. The distance from the fish to the transducer is longest at the outer edges of the cone and shortest when the fish passes directly through the center



Transducer Cone and Fish's Arches

How the Arch Forms

- **Entering the cone:** The fish is far away at the edge, logging a deeper return on the screen.
- **Reaching the center:** The fish gets closer to the transducer as it moves to the middle, making the line curve upward.
- **Exiting the cone:** The fish moves away toward the other edge, and the line curves downward again to complete the arch

Key Factors for Clear Arches

- **Turn off Fish ID:** Built-in "Fish ID" settings turn fish into cartoon icons; turn this feature off in your menu settings to see raw sonar and real arches.
- **Boat speed:** Maintain a steady slow speed, roughly 1 to 3 mph, so targets have time to pass through the cone cleanly.
- **Transducer frequency:** Narrower beams (like 200 kHz) create tighter, sharper arches, while wider beams (like 77 kHz) scan more area

Terminolgy | *Difference of Frequency, Pulse Length & Ping Rate*

Frequency (The Pitch)

--- The pitch of the sound (determines depth and detail)

Frequency is the number of sound wave vibrations per second, measured in kilohertz (kHz).

- **Low Frequency (e.g., 50 kHz):** Long waves that travel deep into the water but show less detail.
- **High Frequency (e.g., 200 kHz):** Short waves that offer sharp, high-resolution details but struggle in deep water.

Pulse Length (The Burst Duration)

--- The duration of the sound burst (determines target separation)

Pulse length (or pulse width) is the actual amount of time the transducer transmits a single sound burst.

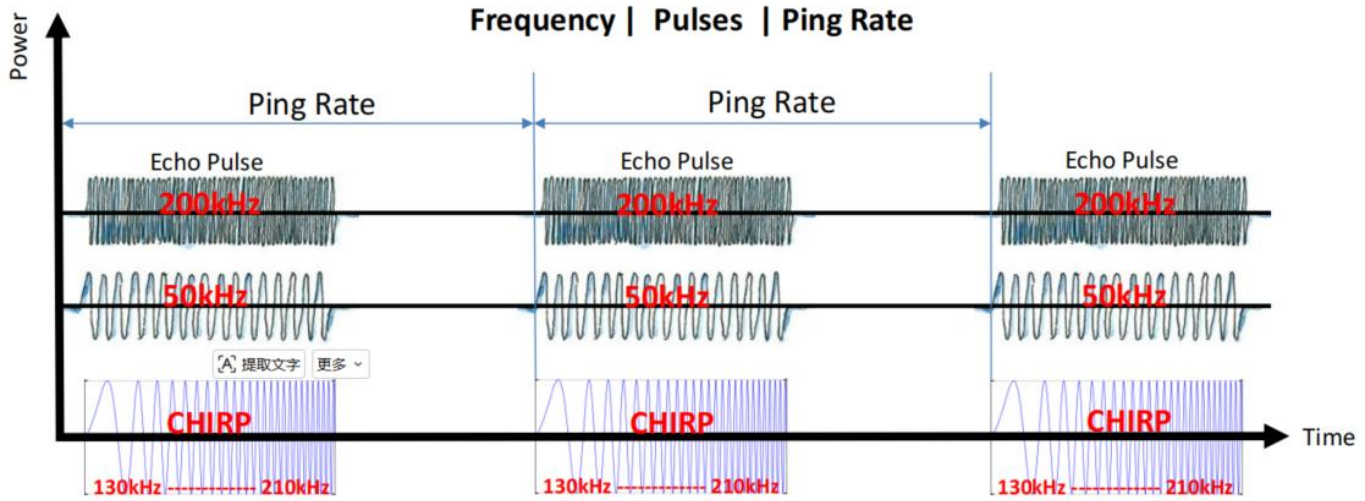
- **Short Pulse:** Excellent for separating close targets, like identifying two fish swimming tight together.
- **Long Pulse:** Puts more energy into the water to reach extreme depths, but blends close objects into a single blob.

Ping Rate (The Speed of Bursts)

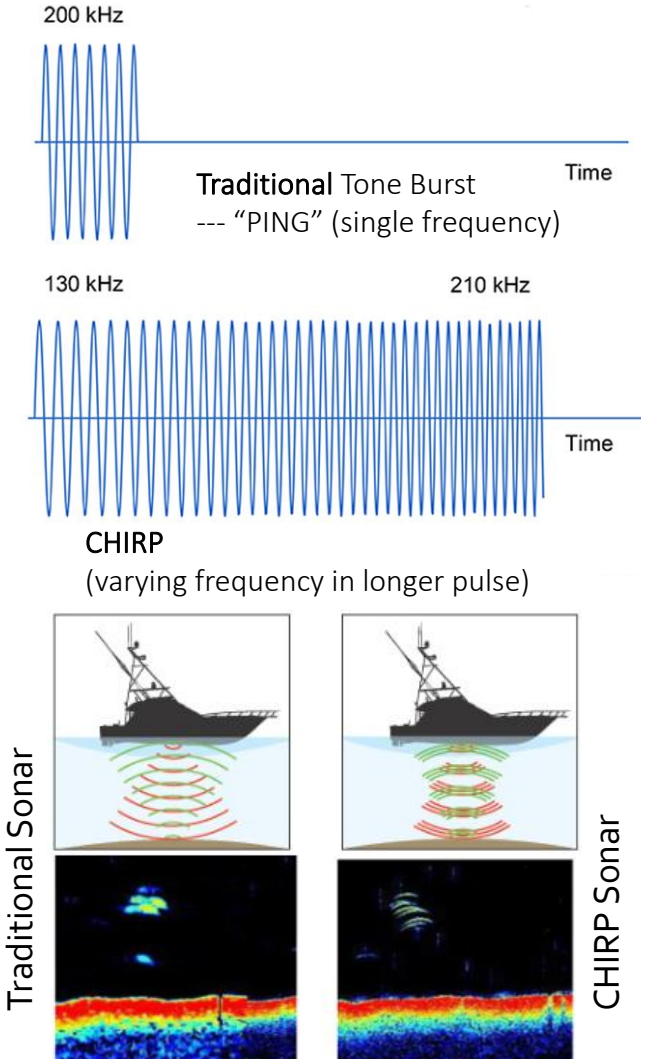
--- The frequency of transmission per second (determines screen update speed)

Ping rate is how many individual pulses of sound the transducer sends down into the water every second.

- **Fast Ping Rate:** Updates the screen quickly, which is crucial when driving fast or tracking fast-moving fish.
- **Slow Ping Rate:** Prevents "ghost" echoes in very deep water where the machine needs to wait for the previous echo to return before sending a new one.



Terminolgy | *Fishfinder Frequencies*



The core difference is that high frequencies give high detail in shallow water, while low frequencies pierce deep into the water but show less detail.

Fish finders use different frequencies to change how wide and how deep their sonar beam travels

High Frequencies (e.g., 200 kHz – 800 kHz)

- **Narrow Beam:** The sound cone is tight and focused straight down.
- **Shallow Depth:** The signal loses energy quickly and cannot penetrate deep water.
- **High Detail:** It easily separates target objects, showing crisp images of small baitfish, weeds, and bottom structure.
- **Best Use:** Fishing in rivers, lakes, or coastal areas under 60 metres deep.

Low Frequencies (e.g., 50 kHz – 83 kHz)

- **Wide Beam:** The sound cone spreads out wide, covering a massive area of the bottom.
- **Great Depth:** The long sound waves push through the water easily without losing power.
- **Low Detail:** The image is less sharp; fish might look like large blobs, and small structures blend together.
- **Best Use:** Deep-sea tracking, looking for large schools of fish, or finding the bottom in hundreds of metres of water.

CHIRP Sonar (The Modern Mix)

Instead of picking just one frequency, modern **CHIRP** (Compressed High-Intensity Radiated Pulse) systems blast a continuous sweep across a range of both low and high frequencies at the same time. This gives you the deep reach of low frequencies combined with the razor-sharp target detail of high frequencies.

Terminolgy | *Fishfinder's Pulse Length*

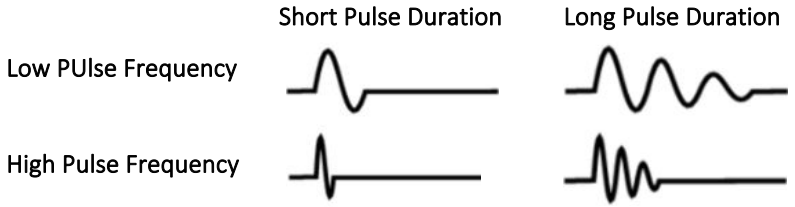
Pulse length (also called pulse width) is the amount of time your fishfinder's transducer spends transmitting a single burst of sound before listening for the echo. It is measured in milliseconds (ms). It directly controls how deep your sonar can see and how well it can separate individual fish swimming close together.

The Pulse Length Trade-Off

Choosing a pulse length is always a balance between **depth power** and **target detail**.

1. Short Pulse Length

- **How it works:** The transducer sends a quick, sharp burst of sound.
- **The Benefit:** High **target separation**. If three fish are swimming tight together, a short pulse will show them as three distinct marks on your screen.
- **The Downside:** It puts less total energy into the water, meaning the signal gets absorbed quickly and cannot travel very deep.
- **Best For:** Shallow water, vertical jigging, and identifying individual fish holding close to structures or bait balls.



[Short Pulse] —> Less Energy —> Shallow Water —> High Detail (Separates Fish)
[Long Pulse] —> More Energy —> Deep Water —> Low Detail (Blurs Fish)

2. Long Pulse Length

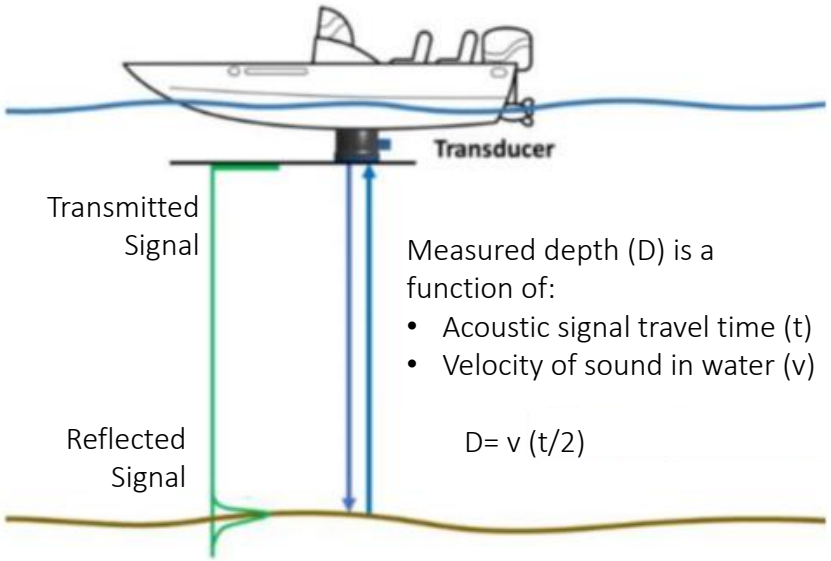
- **How it works:** The transducer sends a sustained, longer burst of sound.
- **The Benefit:** High **power output**. A longer blast carries much more acoustic energy, allowing the sound wave to punch through deep water and return a strong echo from the seabed.
- **The Downside:** Poor target separation. If three fish are swimming close together, the long sound wave hits them all at once, blending them into a single large "blob" on your screen. You also risk losing fish that are sitting tight to the bottom.
- **Best For:** Deep-dropping, tracking the bottom at high speeds, or fishing in deep blue water.

How Modern CHIRP Technology Changes This

If you have a modern **CHIRP sonar**, your fishfinder automatically sends a long pulse that is also modulated across different frequencies. This clever trick gives you the deep-water power of a long pulse combined with the sharp target separation of a short pulse, largely eliminating the need to manually adjust it

Terminolgy | *Fishfinder's Ping Rate*

Fish appear as arches on a fish finder because the transducer emits a cone-shaped sonar beam. The distance from the fish to the transducer is longest at the outer edges of the cone and shortest when the fish passes directly through the center



Pulse Rate (Ping Rate / Ping Speed)

Pulse rate refers to the number of times the sensor emits ultrasonic signals to the bottom of the water per second.

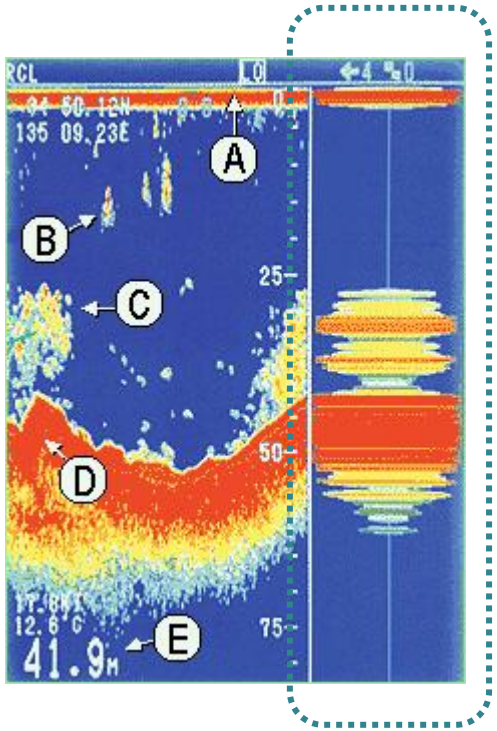
Basic Principle: The higher the pulse rate, the more data points are acquired per second, resulting in more consistent image updates on the screen.

Setting Recommendations:

- During rapid movement: The pulse rate should be increased to avoid missing small targets or structures on the bottom.
- During deep-water operations: The round-trip path of the sound waves is long, and the machine must wait for echoes, thus forcing the pulse rate to decrease.
- Automatic Mode: Most modern fish finders automatically adjust the optimal pulse rate based on the current depth.
- Cautions: An excessively high pulse rate can sometimes cause signal interference (increased background noise) or excessive consumption of processor resources

Terminology | *A-Scope*

A-Scope (also called Real-Time Sonar or Amplitude Scope) is a vertical flash window displayed on the far right-hand side of your fish finder screen. While the main history screen shows you what the boat already passed over in the past, the A-Scope shows you exactly what is happening under the transducer at this very millisecond.



How to Read an A-Scope Window

The A-Scope displays a series of horizontal bars or bands that expand outward like horizontal sound waves.

- **The Width of the Bands (Amplitude):** The wider the horizontal band pushes out to the side, the stronger the echo signal.
- **The Colors:** The colors match your standard sonar palette (e.g., red/yellow for strong targets, blue/green for weak targets).
- **The Depth:** The vertical position of the bars aligns exactly with the depth scale on your screen.

Feature	Standard 2D Sonar Screen	A-Scope Window (Far Right)
What it shows	A history of what you passed over	What is directly beneath you right now
Movement	Scrolls continuously from right to left	Doesn't scroll; flashes and updates instantly
Fish Appearance	Displays as a crescent arch	Displays as a widening horizontal band

Major Benefits of Using A-Scope

1. Instantaneous Reaction Time

Standard 2D sonar scrolls from right to left. By the time a fish arch forms on the middle of your screen, the boat has already driven past it. The A-Scope lights up the exact instant a fish steps into your sonar cone. This is incredibly useful for vertical jigging, as you can watch your lure drop and see a fish rush up to grab it in real time.

2. Identifying Fish vs. Debris

Because the A-Scope measures the true density of a target, it helps you verify fish:

- **A real fish** will show up as a wide, thick, brightly colored band that jitters slightly as the fish swims.
- **Weeds or bubbles** will show up as thin, narrow, flickering lines that lack a solid center core.

Terminology | *Bottom Lock*

Bottom Lock is a fishfinder display mode that magnifies the area right above the seabed and flattens out the bottom contour into a straight line. By locking the bottom of the screen to a fixed, flat plane, it removes the distraction of a bumpy or changing seabed [1]. This makes it much easier to spot bottom-dwelling fish—like snapper, cod, or halibut—that would otherwise blend into the terrain

How Bottom Lock Transforms Your Screen

Feature	Standard Sonar View	Bottom Lock View
Seabed Appearance	Follows the actual terrain (hills, drops, bumps)	Rendered as a completely **flat, straight line** at the bottom
Focus Area	Shows the entire water column from surface to bottom.	Zooms in strictly on a **set window (e.g., 2–5 metres) above the bottom**
Boat Movement Impact	Ocean swells cause the bottom line to wave up and down.	**Eliminates swell bounce**, keeping the target area perfectly steady.
Fish Visibility	Fish holding tight to a reef or hill get lost in the contour	Fish are lifted and **clearly isolated** against the flat background

Why Use It?

- Reveals Hidden Fish: Fish sitting in the dips of a rocky reef or hovering just inches off the sand are easily camouflaged on a standard screen. Bottom Lock separates their echoes from the seabed echo
- Keeps Targets Steady: When your boat bounces on waves, a standard sonar screen bounces too, creating jagged lines. Bottom Lock stabilizes the image so you can see clean fish arches even in rough seas

Terminology | *White-Line*

The **Whiteline** feature (also called **Edge** on some modern units) is a tool used to determine bottom hardness and spot fish hiding tightly against the seabed. When turned on, it changes how the strongest sonar returns are colored, drawing a high-contrast white stripe immediately below the surface layer of the bottom.

How It Identifies Bottom Hardness

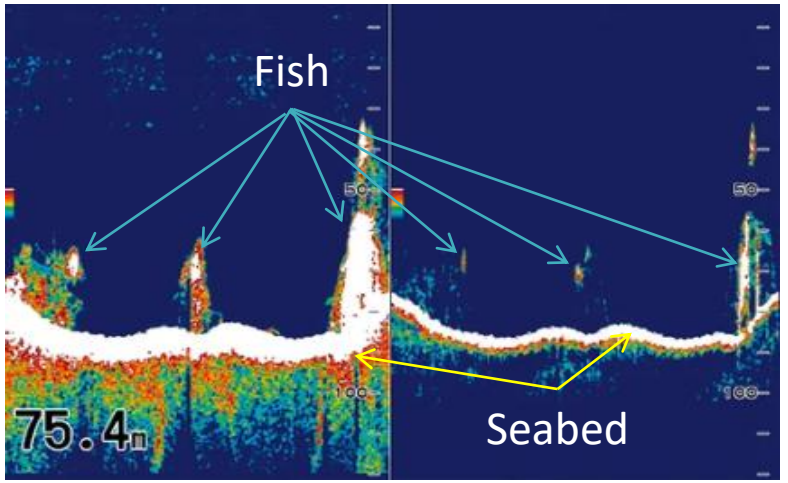
The thickness of the white stripe tells you exactly what the sea floor is made of:

- **Thick White Line:** Indicates a hard or rocky bottom. Rocks, gravel, and compact sand reflect a massive amount of sonar energy back to the transducer, creating a very strong return and a wide white band.
- **Thin White Line:** Indicates a soft bottom. Mud, silt, and thick weeds absorb the sound waves rather than reflecting them, resulting in a weak echo and a very thin or faint white band.

Spotting Bottom-Hugging Fish

Normally, if a fish is resting right on the ocean floor, its sonar arch blends directly into the colored line of the seabed, making it invisible.

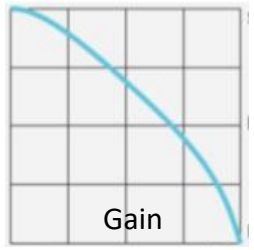
With Whiteline active, the unit forces the seabed profile to drop down into a crisp white band. Any fish sitting in the dirt will stand out as a coloured bump or arch resting cleanly on top of the white line, rather than getting lost in the bottom clutter



Tips for Using Whiteline

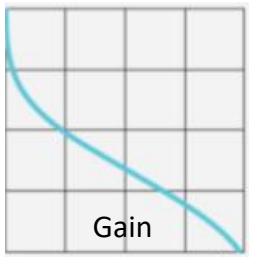
- **For Anchoring:** Use it to find hard gravel or sand patches for a secure anchor hold, avoiding soft mud where anchors can drag.
- **Watch Your Sensitivity:** If your unit's manual gain/sensitivity is set too high, the fish finder can mistake fish or weak structure for the bottom, turning the fish arches white and defeating the purpose

Terminology | *TVG (Time Varying Gain)*



TVG Low

TVG Medium

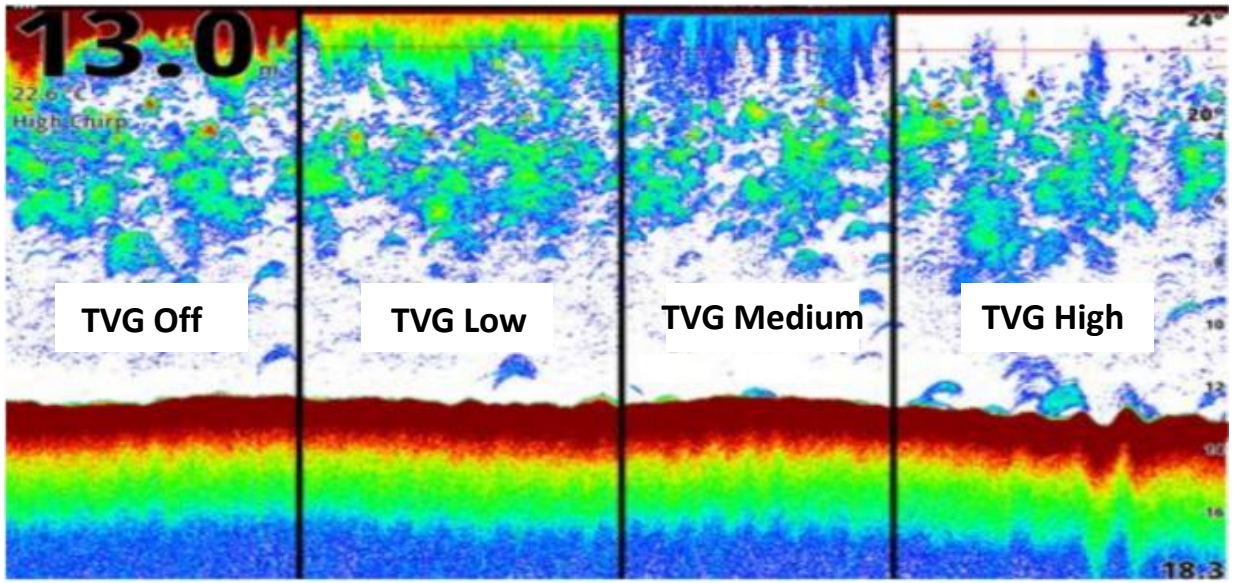


TVG High

The main purpose of TVG is to display fish targets at different water depths on the screen as realistically as possible according to their actual size differences.

- Reduce the gain in the upper water layer near the surface
- Increase the gain in the lower water layer near the seafloor
- The gain increases nonlinearly with depth

Suitable for deep water areas; TVG is not recommended for shallow water areas.



Terminolgy | *Echo Stretch & Filter Width*

Echo Stretch: Echo Stretch makes targets more ronounced and easier to see on the screen. Set too high, targets will blend together; set to low targets become to small and more difficult to see.

Filter Width： Defines the edges of the target. A shorter filter gives clearly defined edges but allows more noise. A longer filter softens target edges and reduces noise.

Optimal Usage Times

- **Echo Stretch (High) & Filter Width (High)** --- *Get Fishfinder the smoothest & most vibrant display*

For Beginners / Fast Cruise / Finding Big Fish in Deep Water

- **Echo Stretch (High) & Filter Width (Low)** --- *A Common advanced setting combination by manual setting*

In Deep Water / When Needing to Quickly Observe Fish Presence Over Long Distances

- **Echo Stretch (Low) & Filter Width (High)** --- *Make screen very clean & smooth, but may cause you to miss some subtle fish signals*

In Shallow Water (typically <10–15 meters) / When There Is Severe Noise Interference / Precise Positioning

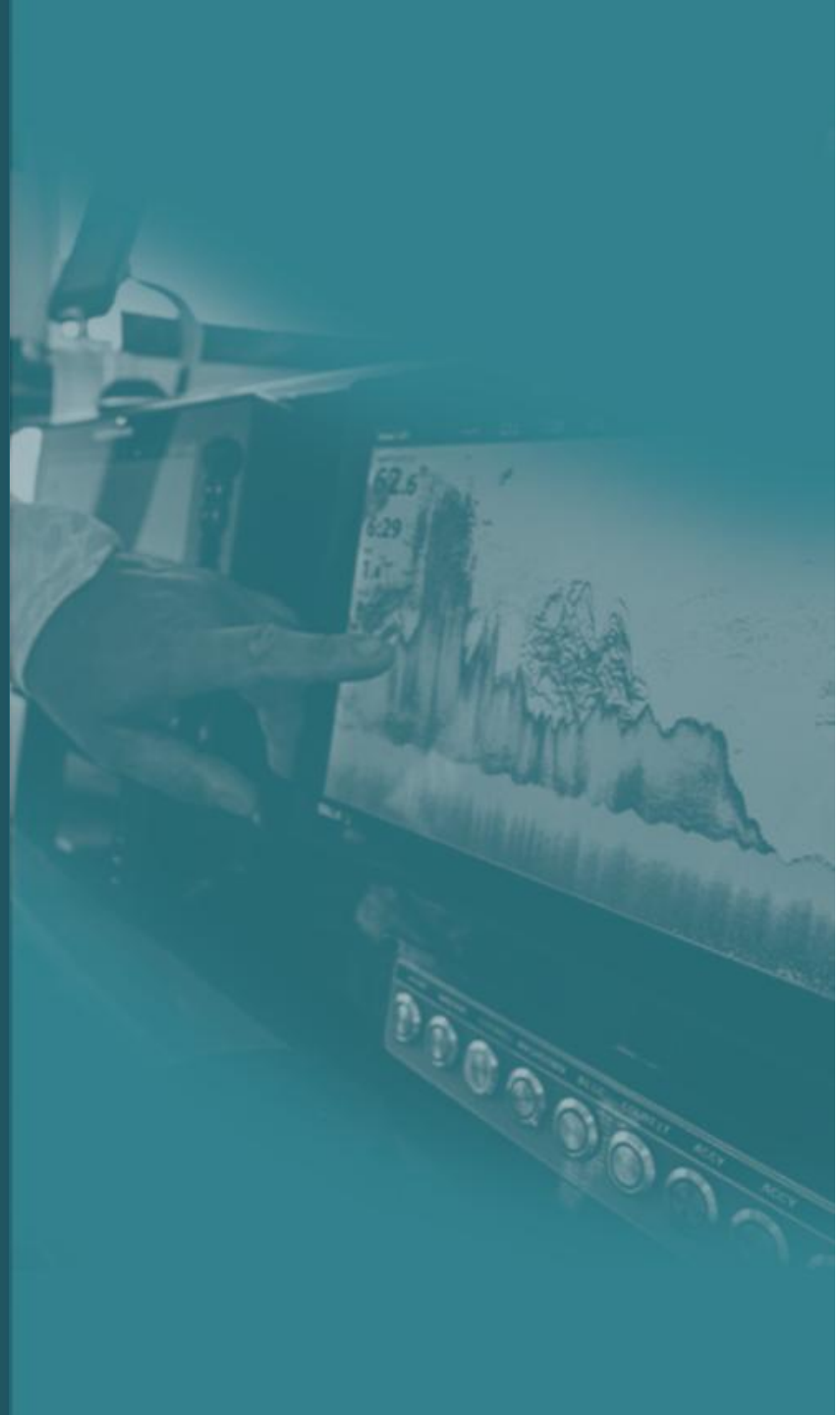
** If nothing to see, try to increase GAIN

- **Echo Stretch (Low) & Filter Width (Low)** --- *Provides the most raw, accurate and low-latency sonar display*

For Professional & Experienced Users / Locating Fish in Structures / Determining Bottom Substrate Hardness / Vertical Fishing (Jigging/Slow Drifting)

** If too much noises, try to reduce GAIN

Fishfinder Controls



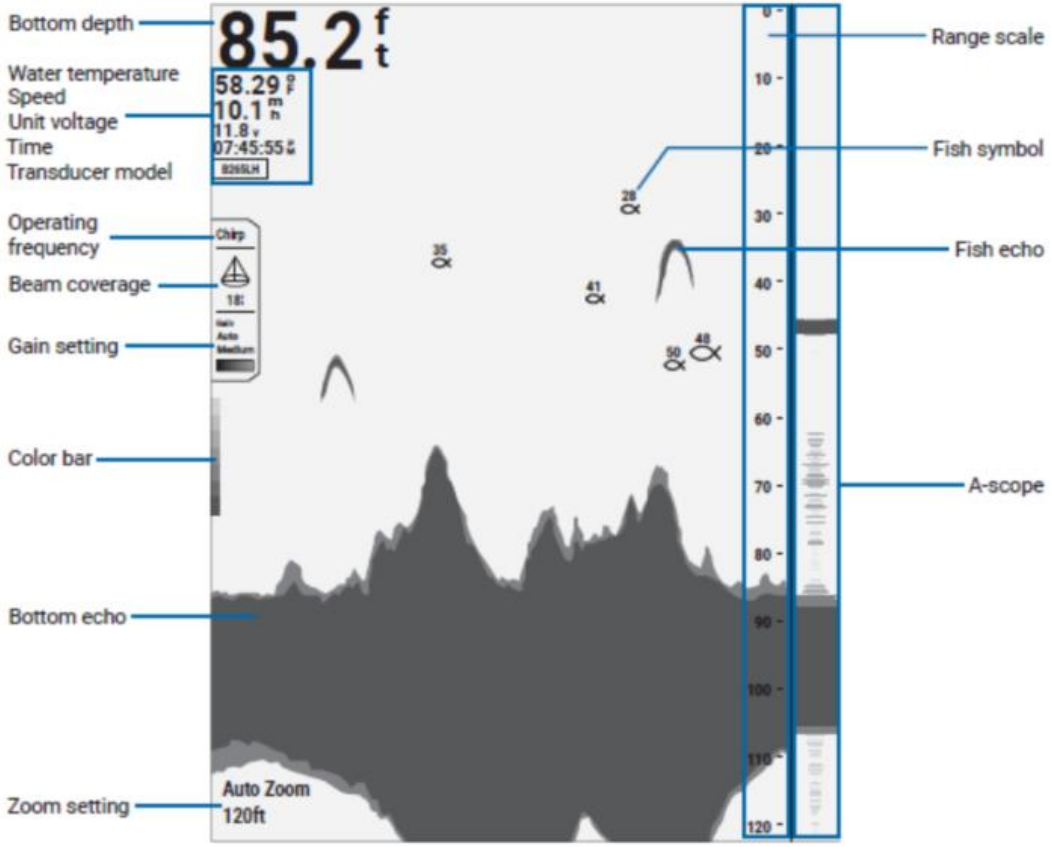
To control your fishfinder effectively, you don’t need to fiddle with dozens of buttons. Mastering just four core controls will allow you to clear up screen clutter, find the bottom, and spot fish in almost any body of water.

Adjusting fishfinder controls is best done in a logical order to filter out noise, identify the bottom, and then fine-tune for fish.
The general, recommended order for tuning is to start with automatic features to establish a baseline, then manually adjust for specific conditions.

Usually adjust the controls in below order:

1. Brilliance
2. Select Range/ Depth (AUTO to MANUAL)
3. Select Frequency
4. Adjust Gain
5. Adjust Color Palette
6. Set Noise Rejection/ Surface Clutter
7. Adjust TVG
8. Select Scroll Speed
9. Adjust Ping Rate

Fishfinder Control | *Auto & Manual*



AUTO MODE

If your fishfinder has automatic control functions, auto-GAIN or auto_RANGE, allow the fishfinder to set the auto-levels until you are familiar with the manual controls.
But you should also learn to manage these functions yourself (unless your fishfinder is completely automatic and doesn't provide this manual option.)
Once you have learned to control these functions' manual adjust, you will find that in bad sea state/water, you can do a better job to get a clear fishfinder picture than the automatic modes possibly can.

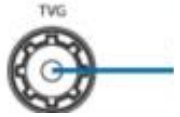
【Recommend】

- New operator uses Auto-mode.
- Experience operator uses Manual-mode.

MANUAL MODE

Turn: Adjust GAIN
Press: Opens the GAIN menu

Turn: Adjust echo stretch in Traditional and Split Frequency modes
Press: Opens the Echo Stretch menu



Turn: Adjust TVG
Press: Opens the TVG menu

Fishfinder Control | *Operation Guideline*

Depth Range (The Window Control)

This setting controls the top-to-bottom window shown on your screen.

- Auto Mode: Good for casual cruising, but the unit constantly recalculates the depth, which causes the screen to jump or lose track of fish in deep water.
- Manual Mode: Always use manual mode when fishing. If you are fishing in 40 metres of water, set your manual range to 45 metres. This keeps the seabed locked at the bottom of your screen and maximizes your screen resolution.

Frequency (The Lens Control)

This changes the pitch of the sound wave your transducer sends into the water.

- High Frequency (200 kHz / High CHIRP): Use this for shallow water (under 60 metres). It provides narrow, sharp, high-definition images.
- Low Frequency (50 kHz / Low CHIRP): Use this for deep water (over 100 metres). It creates a wide cone that pierces deep into the ocean, though with less image detail.

Gain / Sensitivity (The Volume Control)

Think of Gain as the volume knob for your sonar. It controls how much acoustic detail the fish finder displays on the screen.

- Too Low: The screen looks clean, but you will miss weak targets like baitfish, squid, or fish sitting right on the bottom.
- Too High: The screen fills with "snow" and clutter (caused by bubbles, plankton, and thermoclines), making it impossible to see real fish.
- The Fix: Turn the Gain up until the screen gets messy with background dots, then slowly back it down just until the clutter disappears.

Zoom / Bottom Lock (The Magnifying Glass)

When you are targeting fish that live near the seabed, standard view makes the bottom 3 metres look tiny.

- Split-Screen Zoom: Divides your screen in half. One side shows the full water column, while the other side magnifies a specific depth band.
- Bottom Lock: Freezes the bottom line flat at the base of the screen and magnifies the water directly above it. As the boat bounces over waves or rocks, the view stays perfectly locked onto the seabed so you can spot bottom-hugging fish.

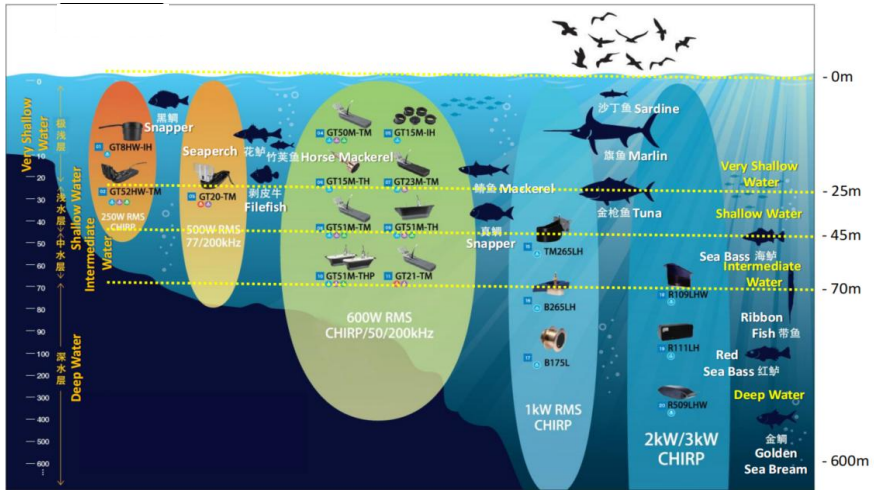
Fishfinder Control | *How to Select Depth & Range*

Selecting your depth and range is the most important adjustment you can make to maximize your screen resolution. Leaving your fish finder on "Auto" forces the computer to constantly recalculate the view, which dilutes detail and can cause you to miss fish completely. The goal is to manually constrain the window to focus only on the water where the fish are actually swimming.

Setting the Depth Range (The Vertical Window)

The general rule of thumb for traditional 2D sonar is the 10% Over Rule. You want your manual depth range set slightly deeper than the actual bottom so you don't lose track of the seabed.

- **Find the Bottom:** Check your digital depth reading (e.g., it reads 22 metres).
- **Apply the 10% Rule:** Set your manual depth range to roughly 25 metres.
- **Why this matters:** This keeps the seabed safely locked at the bottom of your screen, dedicating 90% of your screen pixels to the actual water column where fish are holding.



Using Range for Pelagic vs. Bottom Fishing

How you set your range changes entirely depending on the species you are targeting:

The Bottom-Fishing Profile (e.g., Snapper, Cod, Croaker)

•**The Strategy:** You do not care about the top half of the ocean.
•**The Setup:** Set your overall range to show the bottom, then turn on Split-Screen Zoom or Bottom Lock. Set the zoom window to focus strictly on the bottom 5 metres. This expands the seabed area across half your screen, making a snapper hiding next to a rock look massive.

The Pelagic Hunting Profile (e.g., Tuna, Kingfish)

•**The Strategy:** The ocean floor might be 200 metres deep, but pelagic fish hunt near the surface.
•**The Setup:Ignore the bottom completely.** Manually override the range and lock it to the top 30 to 50 metres. Even if there is nothing but black water below that, your screen will now display the hunting zone with maximum pixel density and clarity, making fast-moving tuna schools incredibly easy to spot.

Fishfinder Control | *How to Select Frequency*

Choose the right sonar frequency for your fishing style and location.

- For **deep-sea fishing**, 50kHz is ideal as it penetrates deeper water and covers a wider area but offers less detail.
- For **freshwater** or **shallow waters**, 200kHz provides higher resolution and better target separation.
- For **scanning wide areas** in shallower waters, 455kHz offers a great balance of coverage and detail, making it ideal for spotting schools of fish or structures.
- For even **more detailed imaging** of structure and bottom composition, 800kHz provides crystal-clear images, though it works best in shallow water.
- **CHIRP sonar** is a versatile option, sending multiple frequencies simultaneously to deliver a clearer, more detailed view of fish and structure.
- If you want **real-time action**, live sonar is perfect for tracking fish movements instantly, making it great for active casting or trolling.

Choosing Frequencies Based on Depth

Water Depth	Suggested Frequency	Beam Angle	Characteristics
Depth (<50m)	455/800kHz	Super Wide	The scan details are extremely fine.
Shallow (<100m)	200kHz	Narrow to Wide	High target resolution, low noise
Medium (100-500m)	80-160kHz	Medium	Balancing resolution and noise
Depth (>500m)	50kHz	Wide	Strong penetration and wide coverage

Fishfinder Control | *Frequency and Applications – Traditional CW Sonar*

Frequency	200kHz			
Output Power	300W	600W	1kW	2kW
Stable Depth	60-100m	120-180m	200-300m	300-400m
Max Depth	150m	250m	450m	600m
Best Use	Shallow seas, reservoirs, and lakes	Nearshore and coastal reef areas	Offshore, searching for mid-water fish	Professional-level in-depth and precise structural detection

Frequency	50kHz			
Output Power	600W	1kW	2kW	3kW
Stable Depth	200-300m	400-600m	600-900m	800-1200m
Max Depth	450m	800m	1200m	2000m
Best Use	Nearshore, deep casting within 200 meters	Offshore, medium-deep deep-sea fishing, bigeye tuna	Deep-sea professional sports fishing and commercial fishing	Extreme deep-sea and seabed geomorphology research

Frequency	28kHz			
Output Power	600W	1kW	2kW	3kW
Stable Depth	450-700m	700-1000m	1000-1500m	1500-2000m
Max Depth	1000m	1500m	2500m	3000m
Best Use	Deep-sea search and large-scale topographic identification	Professional deep-sea sports fishing and bigeye tuna search	Commercial fishing, deep-sea heavy operations	Extreme Abyss, Scientific Exploration

Fishfinder Control | *Frequency and Applications – CHIRP Sonar*

	High-band			
Frequency	130-210 kHz			
Output Power	600W	1kW	2kW	3kW
Stable Depth	150-200m	250-350m	350-500m	450-600m
Max Depth	250m	500m	700m	900m
Best Use	Shallow water, coastal reefs, and precise identification of fish species	Offshore search for mid-water fish, lure tracking	Professional mid-level water precision detection and bottom-dwelling fish identification	Extreme high-frequency detection, commercial-grade deep-sea detail

	Mid-band			
Frequency	80-130 kHz			
Output Power	600W	1kW	2kW	3kW
Stable Depth	250-400m	450-600m	600-850m	800-1100m
Max Depth	550m	900m	1300m	1800m
Best Use	Offshore search and benthic fish along the coast	Offshore and mid-deep sea search	Professional deep-sea sports fishing, commercial fishing	Extreme deep water, identifying deep-sea structures

	Low-band			
Frequency	40-75kHz			
Output Power	600W	1kW	2kW	3kW
Stable Depth	400-600m	600-900m	900-1500m	1200-2000m
Max Depth	800m	1500m	2500m	3000m
Best Use	Advanced deep shooting, finding deep-field terrain	Offshore deep-sea fishing, bigeye tuna, amberjack	Professional deep-sea operations and commercial fishing	Extreme deep-sea exploration, tracking the 10,000-foot abyss

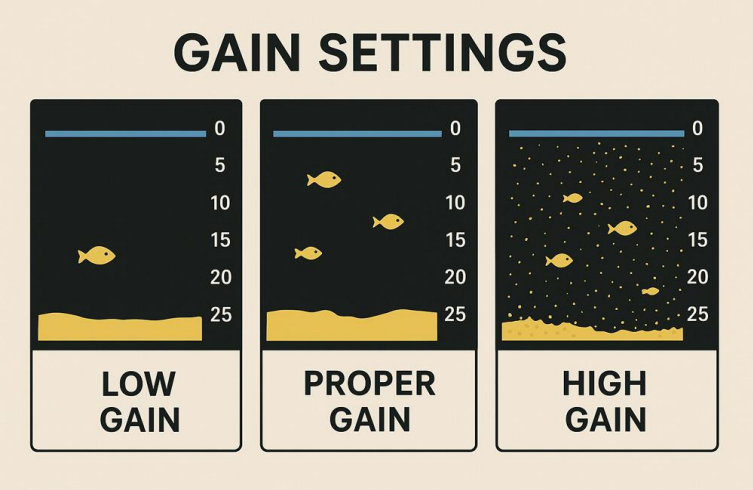
Fishfinder Control | *How to Select Gain*

Selecting your **Gain** (Sensitivity) is like adjusting the volume control on your sonar. If it is too low, you are blind to fish; if it is too high, your screen is flooded with blinding static. The goal is to find the exact threshold where fish stand out clearly against clean water.

The 3-Step Manual Tuning Method

Instead of relying on "Auto Gain," use this foolproof method whenever you enter a new fishing spot:

1. **Flood the Screen:** Drop your line or boat into position. Turn your manual Gain up until the screen is heavily cluttered with random dots, colorful static, and "snow."
2. **Back It Off:** Slowly turn the Gain percentage down. Watch the clutter carefully as you do this.
3. **Lock It In:** Stop turning the moment the chaotic background noise fades away, leaving the seabed line solid and your target fish arches or bait clouds standing out sharply.



Adjusting Gain for Your Environment

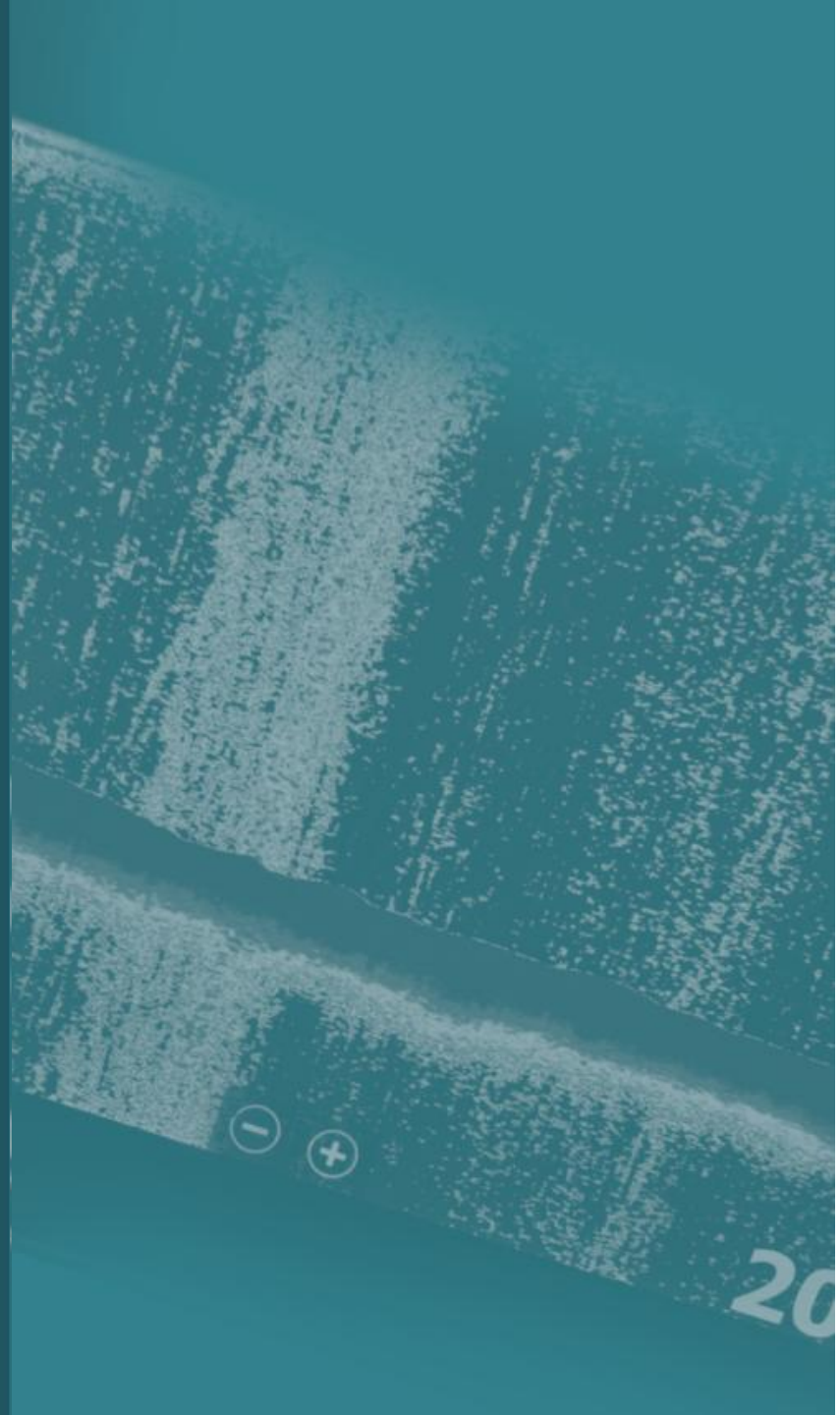
In Shallow or Dirty Water (Rivers, Estuaries, Muddy Bays)

- **The Problem:** Silt, mud, plankton, and tidal currents reflect a massive amount of sonar energy, creating instant screen clutter.
- **The Setting:**Lower the Gain (typically 40% – 60%). You need to desensitize the unit so it ignores the floating mud and debris, allowing the dense bodies of fish to pop through.

In Clear or Deep Water (Offshore Reefs, Open Ocean)

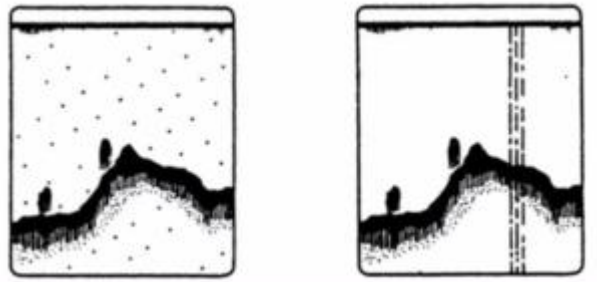
- **The Problem:** Pristine ocean water has very few suspended particles to reflect sound, but deep water rapidly drains the power of your sonar pulses.
- **The Setting:** Raise the Gain (typically 70% – 90%). You need maximum sensitivity to catch the faint, weak echoes returning from deep water or from fish lacking large swim bladders (like tuna or squid)

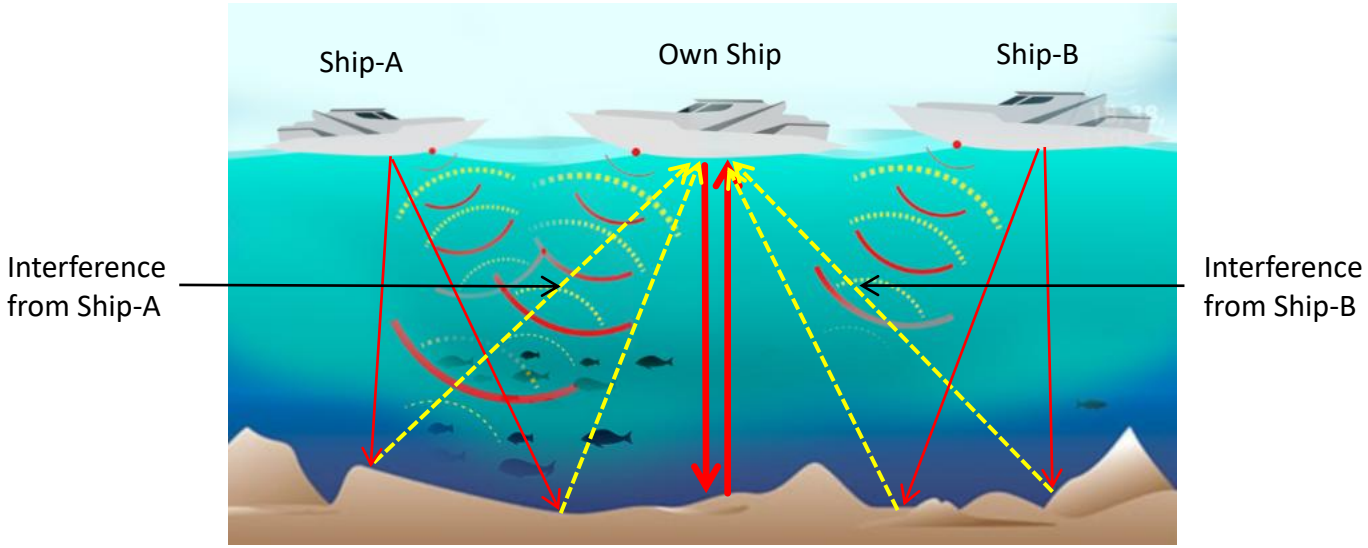
Typical Interferences



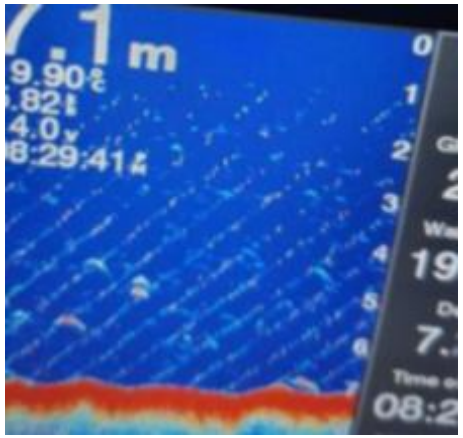
Fishfinder interference generally falls into four main categories: acoustic noise in the water, electrical mess from the boat, environmental clutter and speed-related interference.

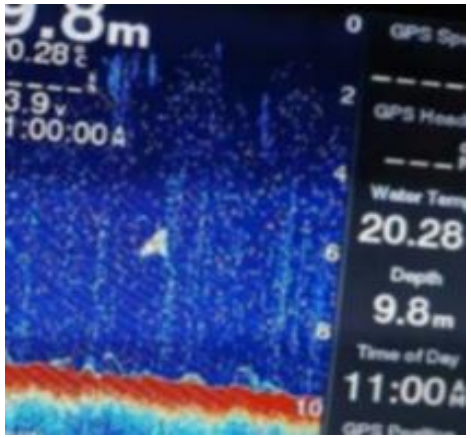
Knowing how to identify each type on your screen is the quickest way to fix it.





Typical Interferences | *Main Electronic Interferences*





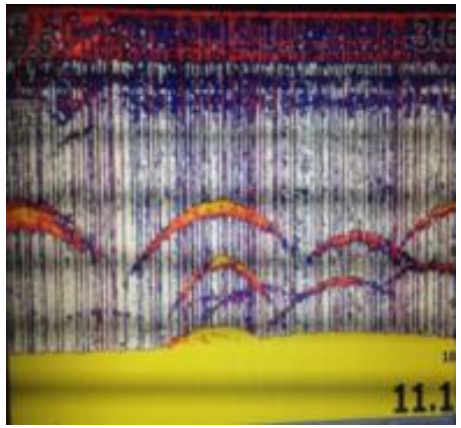
Sonar Crosstalk (Acoustic Interference)

- What it looks like: Perfectly straight diagonal lines, swirl patterns, or geometric dots marching across your display.
- The Cause: This happens when your transducer catches the sound waves of another fish finder operating nearby on the exact same frequency. It is very common when fishing tightly packed docks, popular reefs, or right next to a buddy's boat.
- The Fix: Switch your unit's frequency (e.g., jump from 200 kHz to 83 kHz), or turn on the Interference Rejection setting in your sonar menu.

Electrical Noise & EMI (Rigging Interference)

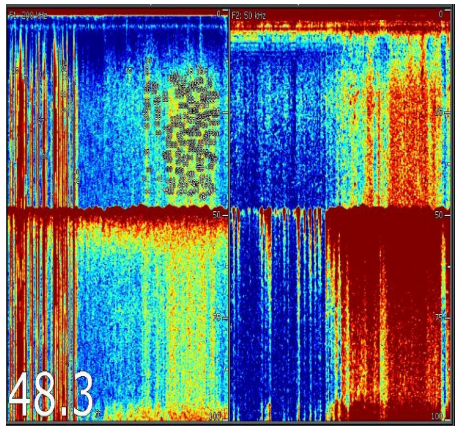
- What it looks like:Vertical lines, jagged spikes, or severe screen distortion that suddenly appears only when you tap the throttle or turn on a boat switch.
- The Cause: High-voltage surges from trolling motors (especially those using pulse-width modulation), bilge pumps, or VHF radios create an electromagnetic field. If your transducer cable is bundled parallel to your boat's main power wires, this electrical "noise" bleeds into your sonar data.
- The Fix: Route your transducer cable as far away from engine and trolling motor power lines as possible. Wire your fish finder directly to a dedicated house battery rather than sharing a starting battery with the motor.

Typical Interferences | *False Echoes Caused by Your Own Ship*



Surface Clutter & Aeration (Environmental Noise)

- **What it looks like:** A thick, solid blanket of random dots, clouds, and messy color clogging the top 2 to 5 metres of your water column.
- **The Cause:** This is caused by physical micro-targets in the surface layer, including air bubbles generated by waves, boat wake, heavy rain, or massive blooms of algae and plankton.
- **The Fix:** Turn up your unit's Surface Clarity or Noise Filter setting. This tells the computer to stop drawing weak acoustic reflections occurring right at the surface layer.



Cavitation (Speed-Related Interference)

- **What it looks like:** The screen reads perfectly fine while drifting, but the moment you accelerate, the entire screen blanks out, freezes, or displays solid vertical bars.
- **The Cause:** Your transducer is physically surrounded by turbulent, bubbly water. This happens if the transducer is mounted too high on the transom, behind a hull rivet, or directly in line with a straking strake that shears the water into froth.
- **The Fix:** The transducer must be physically adjusted or lowered slightly so that it remains in a clean, smooth flow of "clean" water beneath the hull even at high cruising speeds.

Typical Interferences | *Visual Symptom Matrix & Solutions*

If You See This on Screen...	Likely Root Cause	Category	Primary Fix / Adjustment
Diagonal lines, swirls, geometric dots	Another boat's sonar waves overlapping yours	Sonar Crosstalk	Change **Frequency** or turn on **Interference Rejection**
Vertical spikes or lines when accelerating	Trolling motor or engine wiring bleeding power lines into sonar data	Electrical Noise (EMI)	Route transducer cable away from boat power wires
Thick blanket of dots in top 2–5 metres	Waves, wake, rain, or algae creating micro-bubbles at surface	Surface Clutter	Increase **Surface Clarity** or **Noise Filter** settings
Screen freezes or goes blank at high speed	Bubbles and turbulent water swirling under the transducer face	Cavitation	Lower or adjust the physical transom mounting bracket
Screen completely flooded with dense color	Sonar volume is set way too high for current water conditions	Excessive Gain	Lower the **Gain / Sensitivity** control manually
Fish arches look tiny, faint, or unreadable	Target data is compressed over a massive depth window	Poor Resolution	Switch to **Manual Depth Range** and turn on **Zoom**

If your fishfinder is misbehaving, follow this 4-step sequence to isolate the problem:

Step 1: Isolate the Boat's Engine

Turn off your outboard motor, trolling motor and all livewell pumps.

- If the screen clears up: Your issue is Electrical Noise or Cavitation. Move to Step 2.
- If the screen is still messy: Your issue is Environmental or Sonar Crosstalk. Skip to Step 3.

Step 2: Test at Standstill vs. Speed

With the engine running, test the unit while floating perfectly still, then accelerate.

- If it messes up only when moving fast: It is Cavitation. Your transducer is catching bubbles under the hull. Lower the bracket by 3–6 mm into clean water.
- If it messes up even while parked: It is Electrical EMI. Wire your fish finder directly to a separate battery, or install a ferrite choke ring on the power cable.

Step 3: Tune the Gain (Sensitivity)

If the screen has a constant haze of static dots:

- Manually adjust the Gain down to 0%, then slowly increase it.
- Stop increasing the moment the seabed line is clearly visible and small bait clouds appear. If the screen turns into "snow," you have passed the threshold.

Step 4: Toggle Frequencies

If you see perfectly repeating geometric patterns:

- Switch your frequency band (e.g., from High CHIRP to Medium CHIRP, or from 200 kHz to 83 kHz). This instantly breaks the connection with nearby transducers causing crosstalk.

navtiX

Quick-Fix Control Troubleshooting

If Your Screen Looks Like This...	Adjust This Control...	What to Do...
Completely black or blank	Depth Range	Switch from Manual to Auto to let the fishfinder find the bottom first.
Covered in Dots and Static	Gain / Sensitivity	Lower the percentage until the clutter fades away.
Fish Arches Look Tiny and Faint	Zoon / Echo Stretch	Turn on Bottom Lock or increase Echo Stretch.
The Bottom Line is Blinking “- - -”	Frequency / Installation	Ensure the boat is moving slowly; check for air bubbles under the transducer.

FAQ's |

Question: Why does my fish finder lose the bottom when the boat goes fast?

Answer: This is caused by cavitation. Air bubbles and turbulent water are flowing directly underneath the face of your transducer. The transducer is likely mounted too high or right behind a hull rivet/strake. Physically lower the mounting bracket by 3 to 6 mm so the transducer rides in "clean," smooth water beneath the hull.

Question: Can I run two fish finders on my boat at the same time?

Answer: Yes, but only if they run on different frequencies. If both units use the same frequency (e.g., both on 200 kHz), their sound waves will overlap. This creates sonar crosstalk, which looks like geometric dots or diagonal lines marching across your screen. Run one on 200 kHz and the other on 83 kHz, or use distinct CHIRP bands to prevent this.

Question: Should I wire my fish finder to my main engine battery?

Answer: Avoid this if possible. Main cranking batteries experience severe voltage spikes when starting the engine or running a trolling motor. This bleeds electrical noise (EMI) into your screen, causing vertical spikes. Always try to wire your fish finder directly to a dedicated house or electronics battery.

Question: Why do some fish look like "arches" and others look like "lines"?

Answer: It depends entirely on movement. An arch forms when a fish swims completely through your stationary cone of sound (or your boat drives directly over a stationary fish). If a fish swims along at the exact same speed as your boat, it stays in the center of the cone and displays as a flat, continuous horizontal line.

Question: Why do I see baitfish clouds but no big fish arches?

Answer: Your Gain (sensitivity) is likely tuned correctly for small targets, but you may have driven past the predators too quickly. Alternatively, if you are using a very wide-frequency beam, individual predatory fish can sometimes blur into the outer edges of the bait cloud. Try switching to a higher frequency for sharper separation.

FAQ's |

Question: What is the difference between Down Imaging and traditional 2D Sonar?

Answer:

- Traditional 2D Sonar: Uses a wide, cone-shaped beam. It is excellent for tracking fish arches and jigging in deep water, but it lacks razor-sharp background detail.
- Down Imaging: Uses a razor-thin, fan-shaped beam. It creates near-photographic pictures of trees, rocks, and wrecks, but fish will look like tiny, bright dots rather than classic large arches.

Question: When should I use Auto settings vs. Manual settings?

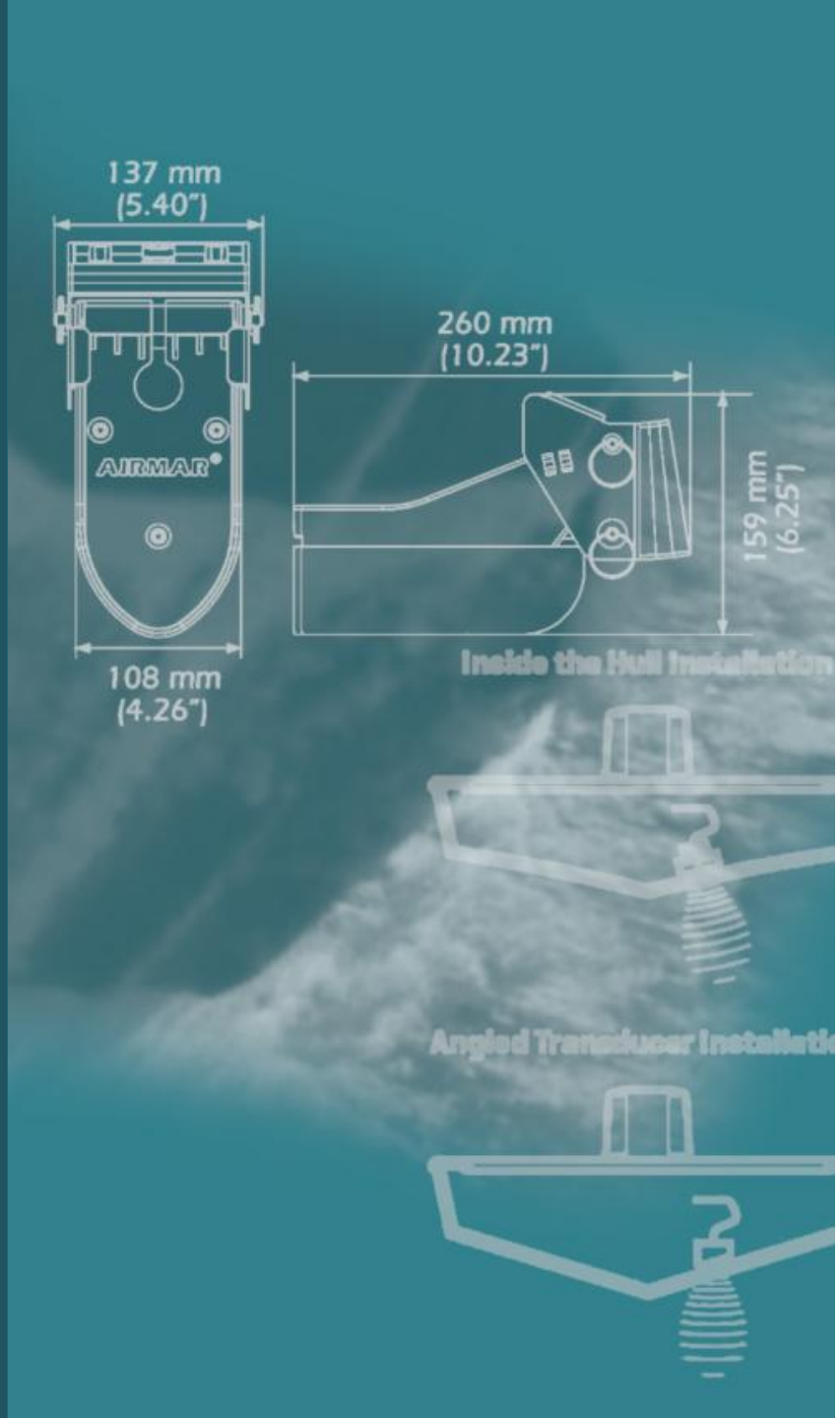
Answer:

- Auto Mode: Use this exclusively when cruising at high speeds or traveling to a new spot just to keep track of the depth.
- Manual Mode: Switch to manual the second you start fishing. Manually locking your Depth Range and tuning your Gain gives you significantly higher screen resolution and prevents the screen from jumping around.

Question: What does the "Fish ID" feature actually do?

Answer: Fish ID removes raw sonar data and replaces arches with cartoon fish icons. While it looks helpful, the computer is easily fooled. It will often label floating bubbles, seaweed, and garbage as fish. Turn it off and learn to read raw arches; you will catch far more fish.

Transducer Installation



An improperly installed transducer is the number one cause of poor fish finder performance, screen clutter, and lost depth readings at speed.
Following a strict step-by-step physical positioning process ensures your transducer sits in a smooth, bubble-free flow of water.

A Perfect Installation Gives You:

- **Clear Readings at Speed:** You can cruise at 25 knots and still clearly read the bottom depth and spot schools of baitfish.
- **Maximum Depth Reach:** Your sonar waves pierce to their maximum rated depth without losing power.
- **Zero Screen Noise:** Your screen remains clean and clear, allowing you to see tiny targets like shrimp, squid, or bottom-hugging snapper.

A Bad Installation Causes:

- **"Screen Blinking" at Speed:** The moment you touch the throttle, the depth reading flashes "---" or freezes because the transducer is lifting out of the water.
- **Blinding Screen Clutter:** The screen fills with a thick wall of white or colorful static, masking real fish arches.
- **Missed Fish:** Air pockets under the transducer block the sonar waves, making it impossible to see the fish directly beneath you.

Transducer Installation | *Transom Mount Transducer*

A **transom mount transducer** is the most common installation method, but it requires exact positioning to ensure your fish finder doesn't lose its signal when the boat speeds up. Following a strict physical setup sequence prevents cavitation (air bubbles) from blinding your sonar.

Step-by-Step Installation Process

Step 1: Find the Sweet Spot

Look at the transom (the flat back wall) of your boat from behind.

- **The Starboard Rule:** Mount the transducer on the starboard (right) side of the engine. Standard propellers rotate clockwise, meaning water on the right side moves downward and contains fewer air bubbles.
- **Clearance:** Position the bracket at least 30 cm away from the propeller arc to avoid blade turbulence.
- **Look Under the Hull:** Ensure the location is not directly behind a hull rivet, a lifting strake, or a water intake scoop. These features rip water into a frothy mist that blocks sonar waves.

Step 2: Set the Perfect Height

Height is a balancing act: too high and it catches air; too low and it creates massive water spray and drag.

- **The Hull Line:** Hold a straightedge (like a level) flat against the underside of the boat hull, extending out past the transom.
- **The 50/50 Split:** Position the transducer so its centerline aligns with the bottom of the hull. The bottom half of the transducer must sit completely in "clean" water below the hull line, while the top half rests level with the metal or fiberglass.

Step 3: Dial in the Tilt (Pitch)

The transducer must point straight down at the sea floor, but it needs a slight forward-to-back tilt to account for the boat's behavior under power.

- **The Kick Down:** Tilt the trailing (back) edge of the transducer downwards by roughly 2 to 5 degrees.
- **Why this matters:** When your boat accelerates, the bow rises and the stern digs in. Giving the transducer a tiny downward tilt ensures it rides perfectly flat and parallel to the surface when the boat is cruising at speed.

Step 4: Run the Cable to Avoid Electrical Interference

Electrical "noise" will ruin a perfect physical installation.

- **No Parallel Runs:** Never bundle or zip-tie your transducer data cable alongside the main heavy-duty power lines for your engine, batteries, or trolling motor.
- **Cross at 90 Degrees:** If the transducer cable must cross a power wire to reach the console, force them to cross at a sharp 90-degree right angle to minimize magnetic bleeding.
- **The Drip Loop:** Before running the cable through the transom hole into the boat interior, leave a small sag or "drip loop" outside. This forces rainwater to drip off the wire onto the floor instead of running straight down into your drilled screw holes.

Transducer Installation | *Thru-Hull Transducer*

A thru-hull transducer installation is the gold standard for large fiberglass boats, offshore vessels, and commercial fishing boats. It requires cutting a physical hole completely through the bottom of your boat's hull so the transducer face sits in direct contact with uninterrupted, bubble-free water. Because it sits beneath the hull, it offers the absolute best high-speed performance and maximum depth tracking.

Step-by-Step Installation Process

Step 1: Measure Your Hull Deadrise

You must know the angle (slope) of your boat's hull where the transducer will be placed. Use a digital level or a smartphone leveling app while the boat is on a flat trailer. If your deadrise is 16 degrees, you must purchase a 15°–20° Tilted Element transducer so the sonar beam points straight at the bottom.

Step 2: Choose the Perfect Underwater Location

The location must have a completely smooth, turbulence-free flow of water beneath it at all speeds.

- The Placement: Position it in the rear third of the vessel, close to the centerline (keel).
- In Front of the Propellers: It must be mounted forward of the propellers and rudder to avoid catching engine wake.
- Avoid Intake Grates: Never place a thru-hull transducer directly behind water intake scoops, strainers, or step-hulls, as they rip the water into micro-bubbles.

Step 3: Drill the Pilot Hole and Main Core

- Double-check the interior of the bilge to ensure there are no fuel lines, stringers, structural ribs, or electrical wires hidden behind your target spot.
- Drill a tiny 3 mm pilot hole from the inside of the boat out to verify the position.
- Go outside the boat and use the exact size hole saw specified by the manufacturer (usually 51 mm or 60 mm for bronze/plastic housings) to cut the main hole.

Step 4: Dry Fit and Seal the Hull

- Dry Fit: Insert the transducer into the hole without any glue to ensure it sits perfectly flush against the outer hull.
- Apply Marine Sealant: Clean both surfaces with rubbing alcohol. Apply a massive, liberal coating of marine-grade adhesive sealant (such as 3M 5200 Marine Sealant) to the transducer flange and the exposed fiberglass core inside the hole.
- The Golden Rule: Never use standard silicone. You must use a true underwater marine adhesive polyurethane.

Transducer Installation | *In-Hull Transducer*

An **in-hull transducer** (also known as a shoot-through-hull transducer) is mounted completely inside the boat's bilge, glued directly to the interior floor. Because it fires its sonar beam straight through the fiberglass hull, it requires no drilling below the waterline, never catches weeds, and provides exceptional readings at blistering speeds.

Step-by-Step Installation Process

Step 1: Find the Best Location

The transducer needs to sit in a spot that has clean, undisturbed water passing underneath the boat at all speeds.

- **The Sweet Spot:** Place it in the **rear third of the boat**, close to the centerline (keel).
- **Avoid Turbulence:** Ensure it is located well forward of the propeller and engine, and not directly behind any hull steps, strakes, or water intakes.

Step 2: The "Ziploc Bag" Testing Trick

Before permanently gluing the transducer down, you must test the location on the water:

1. Put the boat in the water.
2. Place the transducer inside a plastic Ziploc bag filled with water, or submerge it in a small puddle of water in the lowest part of your bilge.
3. Hold the transducer flat against your target spot on the hull.
4. Take the boat for a drive. If you get a clean, crisp depth reading at high speed, you have found your mounting spot.

Step 3: Prep the Fiberglass Surface

Once you find the spot, pull the boat back onto the trailer.

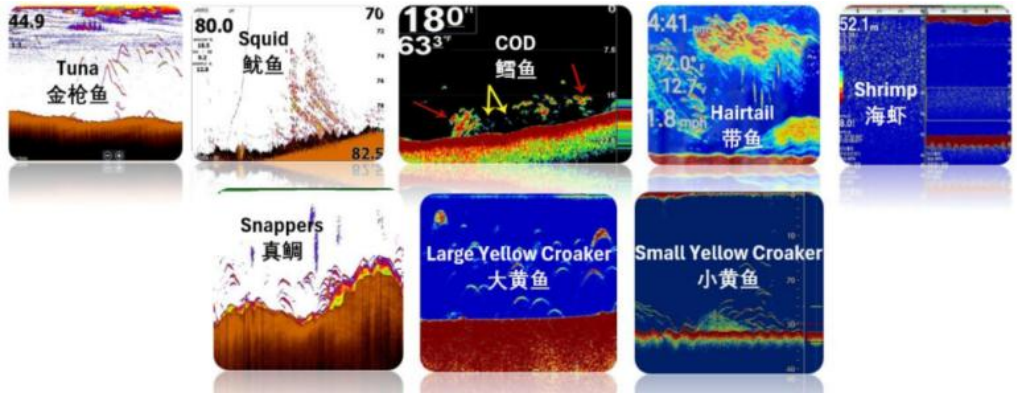
- Sand the target area inside the bilge using 80-grit sandpaper until the glossy gelcoat or paint becomes completely dull and rough.
- Wipe the area clean with rubbing alcohol or acetone to remove all grease, dust, and bilge oil. The glue will not stick to a dirty surface.

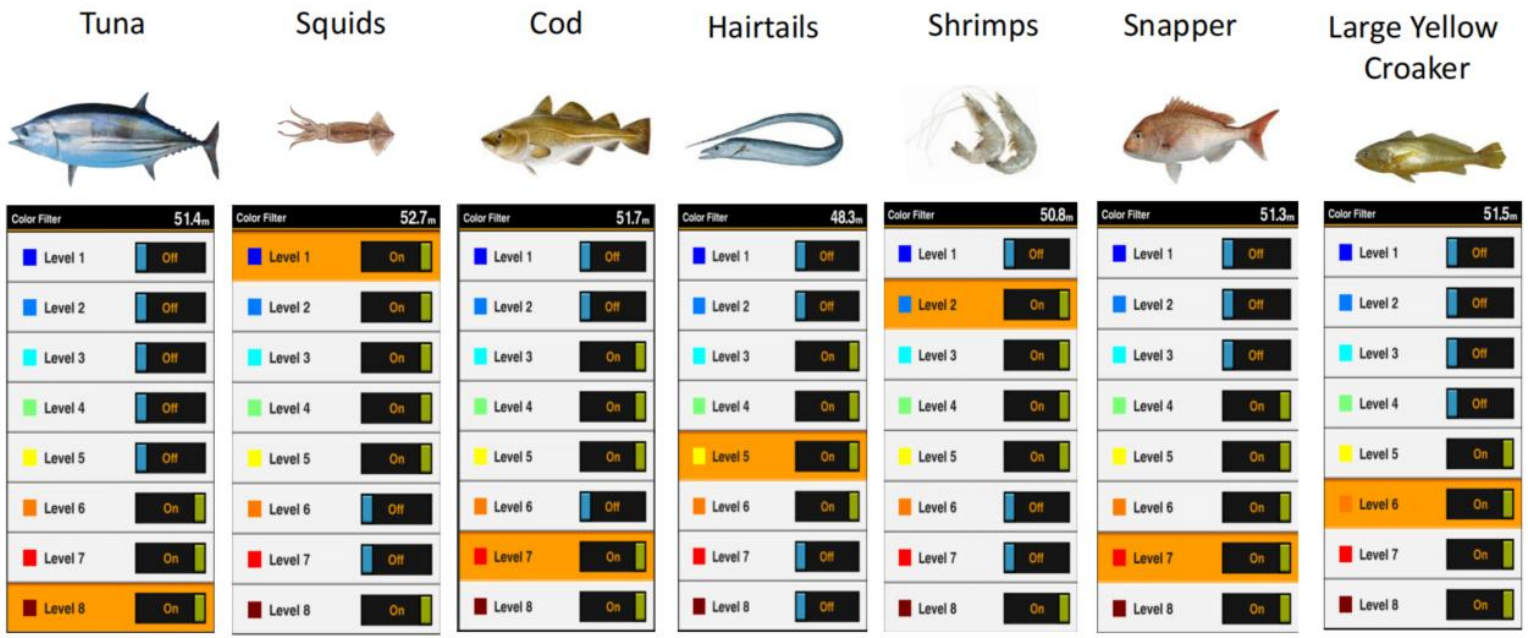
Step 4: Mix and Apply Epoxy

Air bubbles are the ultimate enemy of an in-hull installation. Even a single micro-bubble trapped in the glue will block your sonar.

- Use a slow-cure, two-part marine epoxy (avoid fast-curing 5-minute epoxies, as they trap too many bubbles when mixed).
- Stir the two parts together very slowly and smoothly with a flat stick to prevent whipping air into the mixture.
- Pour a generous pool of epoxy onto the sanded hull area, and apply a thin layer to the face of the transducer itself

Targeting Specific Fish





Targeting Specific Fish | *Tuna*

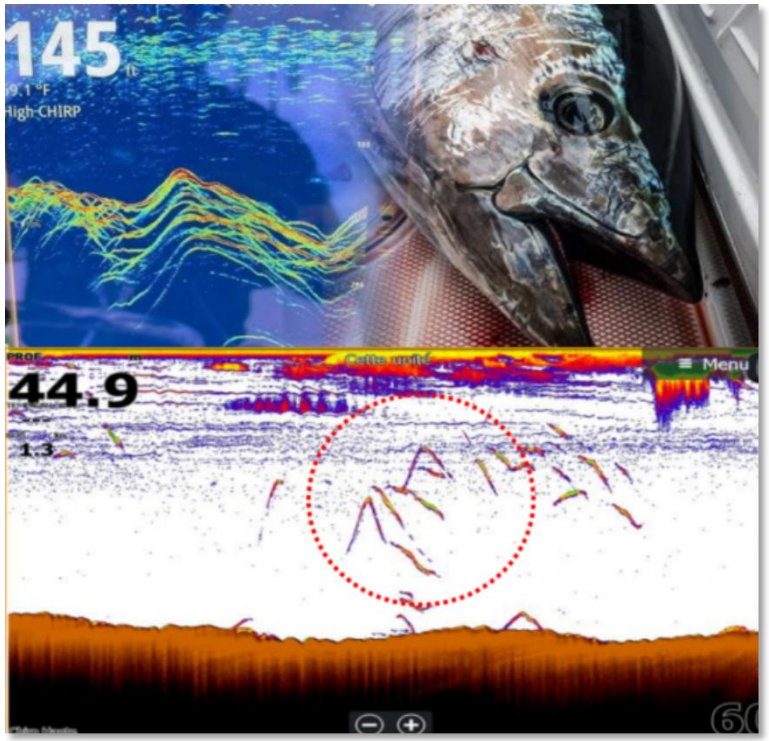
Targeting **tuna** with a fish finder is completely different from scanning for bottom-dwellers like yellow croaker. Tuna are fast, wide-ranging **pelagic fish** that swim high up in the water column over deep ocean water. Because they move rapidly and often target fast baitfish, you need to adjust your settings for **speed, wide angles, and upper-water column detail**

Recommended Fish Finder Settings for Tuna

- **Set a Wide Beam Angle:** You want a transducer with a wide cone (like a High-Wide CHIRP or a dedicated 25-degree wide beam). Tuna swim fast; a narrow beam will miss them as they zip past the boat.
- **Switch to Manual Depth Range:** Even if the ocean floor is 1,000 metres deep, do not use Auto-Range. Set your manual range to focus strictly on the top 30 to 100 metres (100 to 300 feet) of the water column. That is where pelagic hunting happens.
- **Use Mid-Band or High-Wide Frequencies: Medium CHIRP (85–165 kHz)** is famously excellent for targeting tuna and marlin. If using traditional single frequencies, running a low frequency (50 kHz) will help pick up the dense body mass of large tuna in deep water, but a High-Wide frequency will track the schools better closer to the surface.
- **Crank Up the Scroll and Ping Speed:** Set your unit's ping speed and scroll rate to high or maximum. Because tuna travel at blistering speeds, slow sonar settings will display them as tiny, unreadable specks or miss them entirely.

What to Look for on the Screen

- **Solid Boomerang Arches:** Because of their speed and elongated tails, large tuna often create incredibly thick, jagged, or elongated boomerang-shaped arches rather than soft, perfect curves.
- **"Cracked" Bait Balls:** Locating tuna often means locating their food first. Look for large, dense clusters of baitfish (which show up as big solid clouds of color). If you notice a large indentation, a hole, or scattered "cracks" in the bait ball, that is a clear indicator that tuna are actively slashing through it to feed.
- **Long Vertical Lines:** If you are trolling or drifting and a tuna swims directly alongside your boat at the exact same speed, it won't form an arch. Instead, it will look like a long, thick, continuous horizontal line stretching across your screen.



Pinpointing Bluefin Tuna: 60 kHz or 88 kHz

Targeting Specific Fish | *Squids*

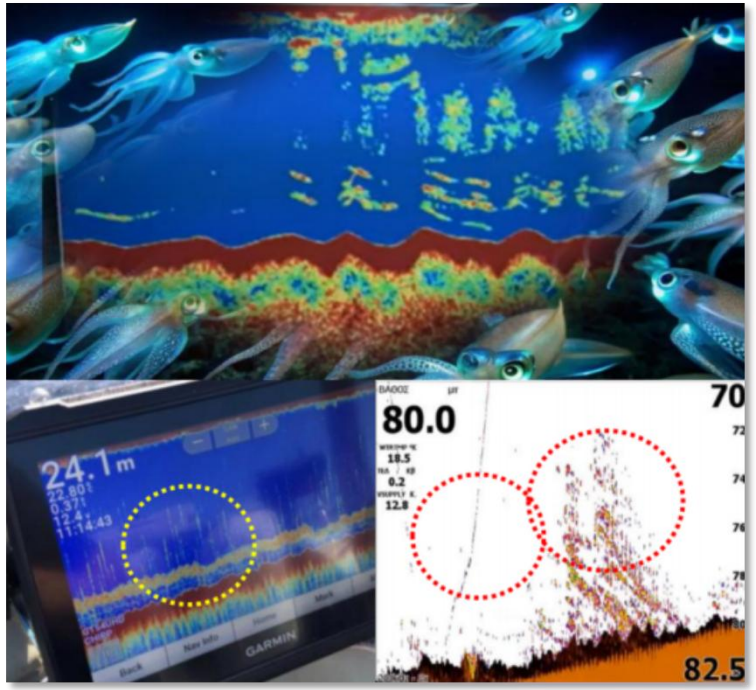
Squid are incredibly difficult to see on a traditional fish finder because they do not have a hard skeleton or an air-filled swim bladder to bounce sonar waves back to your boat. Instead, they possess a soft, fluid-filled body and a thin, internal cartilage shell called a gladius. Because they return such a weak echo, tracking squid requires very specific frequency adjustments and an eye for untraditional screen markings.

Recommended Fishfinder Settings for Squid

- **Run a High CHIRP or High Frequency (200 kHz):** Lower frequencies pass straight through their soft bodies undetected. High frequencies are essential for capturing returns from low-density targets like squid skin and tentacles.
- **Gently Bump Up the Sensitivity:** You need to increase your unit's gain or sensitivity slightly above your normal baseline. If you turn it up too high, the screen will flood with clutter; turn it up just enough to pick up weak signals without masking the screen in a solid sheet of noise.
- **Turn on Bottom-Zoom or Split-Screen:** During daylight hours, squid tend to sit close to the ocean floor. Splitting your screen to zoom in closely on the bottom 5 to 10 metres helps you separate faint squid marks from the bottom profile itself.

What Squid Look Like on the Screen

•**Stacked Horizontal Lines or "Scratches":** Unlike the distinct, sweeping arches made by predatory finfish, squid typically show up as short, flat, stacked horizontal lines or scratch marks. They generally appear within 6 metres (20 feet) of the seabed during the day.
•**Faint Blue or "Cool Color" Patches:** Because the returning signal is weak, squid rarely register in the dense reds or bright yellows of a standard sonar palette. Instead, a cluster of squid will often show up as faint blue, light green, or pale grey fuzz.
•**A Thin, Broad "Fog" Cloud:** If squid are abundant or balling up to feed, they do not form a dark, dense cloud like a baitball of sardines. Instead, they look like a loose, semi-translucent fog or fine mist hanging in the lower or mid-water column.
•**"Hugging" the Bottom:** When drifting over a flat, muddy, or sandy bottom, look for marks that are completely sucked down right against the seabed line. If you see faint, flat layers touching the bottom line, it is a prime spot to drop a jig.



Pinpointing Squids: 133 kHz

Targeting Specific Fish | *Shrimps*

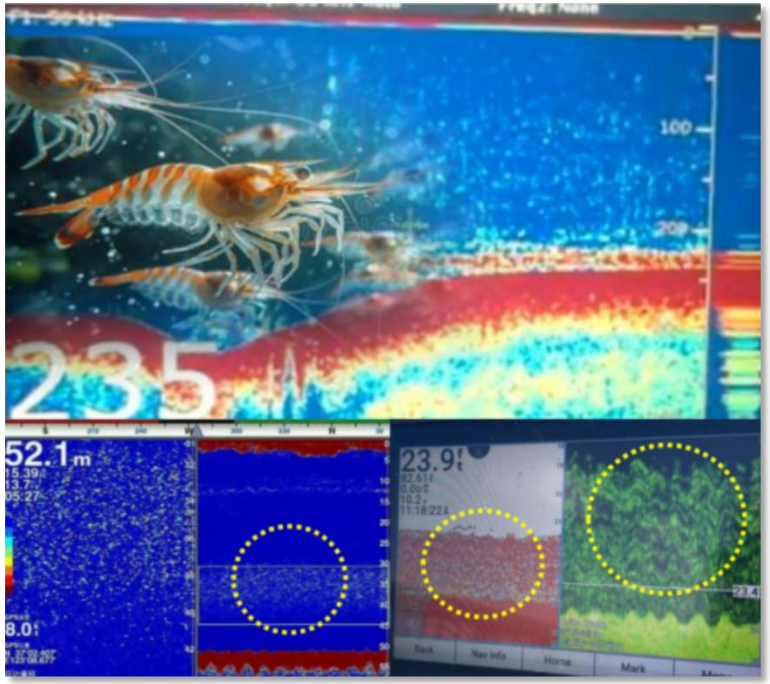
Finding **shrimp** (or prawns) on a fish finder is famously difficult because they lack a gas-filled swim bladder, which means they return a incredibly weak sonar signal. However, because they gather in massive, tightly packed numbers, you can absolutely track them if you know what to look for and how to dial in your equipment.

Recommended Fish Finder Settings for Shrimp

- **Use High Frequency (200 kHz):** You need the absolute highest detail setting your traditional sonar offers. Lower frequencies (like 50 kHz) will pass right through shrimp without bouncing back.
- **Crank Up the Gain/Sensitivity:** Because a shrimp's shell and body return a very soft echo, you need to manually turn up your unit's gain or sensitivity higher than you would for normal fish tracking. Turn it up until you see "noise" (clutter) on the screen, then back it off just a fraction.
- **Zoom in on the Bottom:** Most shrimp species spend their time directly on or within a foot of the seabed. Use the **Bottom Lock** or **Split-Screen Zoom** feature to focus entirely on the bottom 2 to 3 metres of the water column.

What Shrimp Look Like on the Screen

- **"Fuzz" or "Grass" on the Bottom Line:** Unlike fish which form clean, distinct arches, shrimp usually look like a layer of fine fuzz, light clutter, or a second soft line sitting right on top of the solid bottom tracking line.
- **Tiny Dots or Hash Marks:** If your sonar has excellent target separation, a dense group of shrimp will show up as a cluster of tiny, separated aqua-blue or green dots right against the floor.
- **No White Space:** Pay close attention to the gap between the seabed and the targets. If there is no white space between the bottom and the dots, you are likely looking at shrimp. If there is a clear gap and the cluster looks like a solid cloud, it is more likely a ball of baitfish.
- **Balling Up at Sunset:** Shrimp are highly sensitive to light. Watch your screen close to sunset; you will often see that flat layer of bottom "fuzz" begin to ball up, thicken, and lift slightly off the floor as they prepare to move.



Pinpointing Shrimps: 200kHz or CHIRP-H

Targeting Specific Fish | *Snappers*

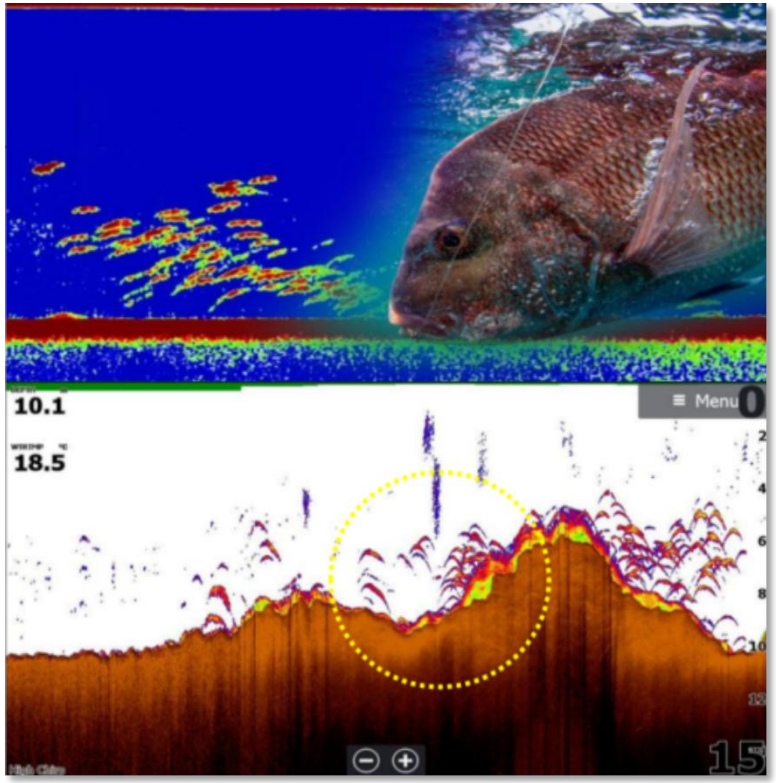
Snapper (including Australasian snapper, red snapper, and mutton snapper) are excellent targets for fish finders because they possess a massive, thick-walled swim bladder. Because snapper are highly structure-oriented fish that love rocky reefs, ledges, foul ground, and pinnacles, your main challenge is distinguishing the fish from the hard, jagged bottom they hide in

Recommended Fish Finder Settings for Snapper

- **Use High CHIRP or 200 kHz:** Snapper are commonly targeted in waters ranging from 10 to 80 metres deep. A high frequency gives you the razor-sharp target separation needed to spot a snapper hovering just millimeters away from a jagged rock edge.
- **Turn on Split-Screen Zoom (Bottom Lock):** Snapper love to hold tight to structure or sit inside deep underwater gutters. Use the Bottom Lock feature to freeze the bottom of your screen and magnify the lowest 2 to 5 metres of the water column.
- **Dial Down the Gain/Sensitivity Slightly:** Rocky reefs return an incredibly powerful echo that can flood your screen with bright red "clutter." Turn your gain down just enough so the reef looks solid, allowing individual fish arches to pop out cleanly against the rock.

What Snapper Look Like on the Screen

- **Thick, Distinct "Crescent" Arches:** Snapper have deep, tall bodies and large swim bladders. This produces beautifully shaped, thick, defined crescent arches on traditional 2D sonar.
- **Intense Red or Yellow Centers:** Because the air inside their swim bladder reflects almost 100% of the sonar signal, the center of a snapper arch will show up as a solid, bright red or deep orange core, even if the fish is small.
- **The "Christmas Tree" Stack:** When snapper are actively schooling or spawning over gravel patches or low-lying reefs, they stack on top of each other. Look for a pyramid shape of cleanly separated, colorful arches rising up from the seabed.
- **Separating Fish From Reef:** If you look at a sharp rocky peak on your screen, look for arches that have a tiny bit of white space (blank water) between the arch and the rock. If there is no white space, it is just a bump on the rock; if there is a gap, it is a snapper holding in the current



Pinpointing Snappers: 200kHz/CHIRP-H or 50kHz/CHIRP-L

Targeting Specific Fish | *Cobs*

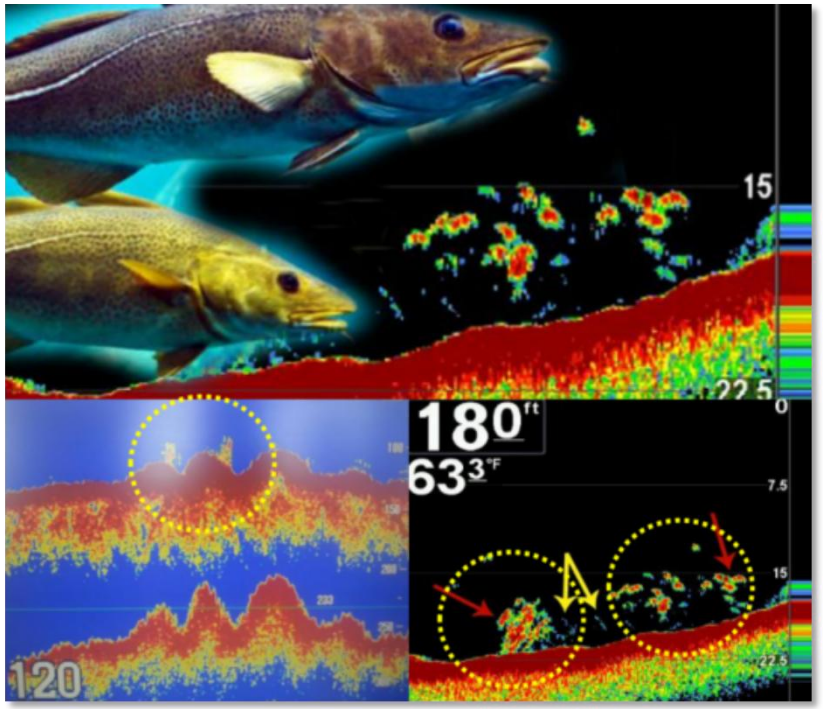
Cod (such as Atlantic or Pacific cod) are excellent targets for fish finders because they have large, thick-walled swim bladders that reflect sonar waves incredibly well. Because cod are cold-water, bottom-dwelling predators that love deep reefs, wrecks, and drop-offs, you need to set up your fish finder to punch through depth while maintaining crisp detail.

Recommended Fish Finder Settings for Cod

- **Use Medium to Low CHIRP (or 50 kHz / 83 kHz):** Cod are often targeted in deep water ranging from 30 to over 150 metres. High frequencies (200 kHz) lose energy too fast at these depths. A lower frequency or Medium CHIRP will easily reach the seabed while still giving you clear target separation.
- **Turn on "Bottom Lock" or Split-Screen Zoom:** Cod hug the bottom tightly, often hiding in the dips of rocks or structures. Use a split-screen with bottom zoom to magnify the lowest 3 to 5 metres of the water column so they don't blend into the sea floor line.
- **Adjust Screen Scroll Speed to Medium:** Since cod fishing usually involves slow drifting or vertical jigging rather than high-speed trolling, set your scroll speed to match your drift speed. This prevents the screen from stretching out your arches.

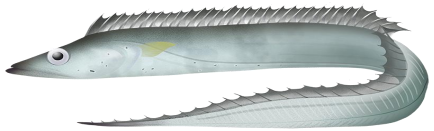
What Cod Look Like on the Screen

- **Thick, Heavy Arches:** Because cod are thick-bodied fish with large swim bladders, they produce very bold, distinct, and thick arches on the screen.
- **Bright Red or Dark Pink Centers:** In standard color palettes, the dense air inside a cod's swim bladder returns a maximum-strength echo. Look for arches with an intense, bright red, orange, or yellow core, surrounded by a thinner blue or green outer edge.
- **"Separated" From Structure:** Unlike a school of small baitfish that looks like a solid cloud, a group of cod will show up as individual, cleanly separated large arches stacked closely together just above a reef or wreck.
- **The "Lump" on the Bottom:** When cod are resting completely still on a flat, sandy bottom, they may not form a perfect arch. Instead, look for small, irregular "lumps" or bumps rising up off the flat bottom line. If the lump shows a bright red center, it is highly likely a cod.



Pinpointing Cod: 175kHz & 38kHz

Targeting Specific Fish | *Hairtails*



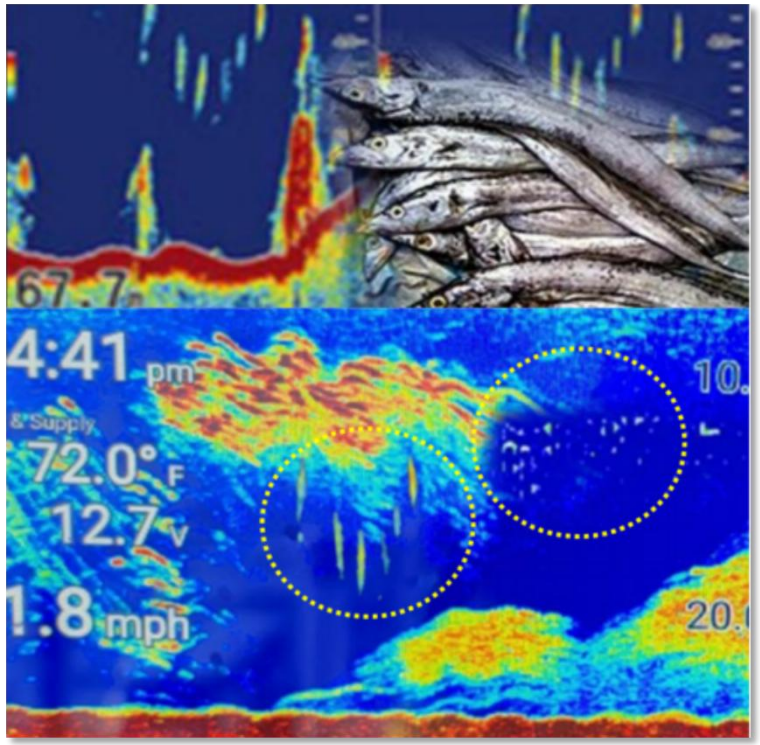
Hairtails (also known as ribbonfish or beltfish) are fascinating targets on a fish finder. They are long, blade-like pelagic predators with a highly reflective silver skin and a well-developed, elongated swim bladder. Because they spend their days suspended in deep water and migrate straight up into the upper water layers at night to feed, your fish finder settings need to change depending on the time of day

Recommended Fish Finder Settings for Hairtails

- **Use High CHIRP or 200 kHz for Night Fishing:** When hairtails move into shallow coastal bays, piers, or surface waters at night to chase bait, high frequencies will give you the sharpest detail in the top 5 to 20 metres.
- **Switch to Medium CHIRP / 83 kHz for Daytime:** During the day, hairtails retreat to deeper mud bottoms or offshore trenches (often 60 to 100+ metres deep). A medium or low frequency is necessary to reach these depths effectively.
- **Turn on Split-Screen Zoom:** Hairtails often suspend vertically in the water column like standing sticks. Zooming into the specific depth band where baitfish are present helps you isolate the hairtail marks surrounding the school.

What Hairtails Look Like on the Screen

- **Tall, Vertical Lines or "Slashes":** Because hairtails are unique vertical swimmers—often hovering completely upright in the water to look for prey above them—they do not form standard horizontal arches. Instead, they look like thin, steep vertical slashes, jagged columns, or tall marks on your sonar.
- **"Fencing" Around Bait Balls:** Hairtails hunt in aggressive packs. On your screen, look for a tight, dense cloud of baitfish (red/yellow mass) with fainter, jagged blue or green lines completely surrounding or framing the edges of the cloud. These are the hairtails waiting to strike.
- **Mid-Water Suspended Layers:** Unlike cod or croaker, hairtails rarely lay flat on the bottom. Look for them suspended right in the middle of the water column, typically holding just below a distinct temperature change line (thermocline) or a shadow line.
- **Bright Red Cores:** Despite their thin bodies, their long swim bladders return an incredibly strong, dense echo. On your screen, even a thin hairtail mark will often feature a bright red or intense yellow core.



Pinpointing Hairtail: 38kHz / 50kHz/ 80kHz & CHIRP-H

Targeting Specific Fish | *Yellow Croaker*

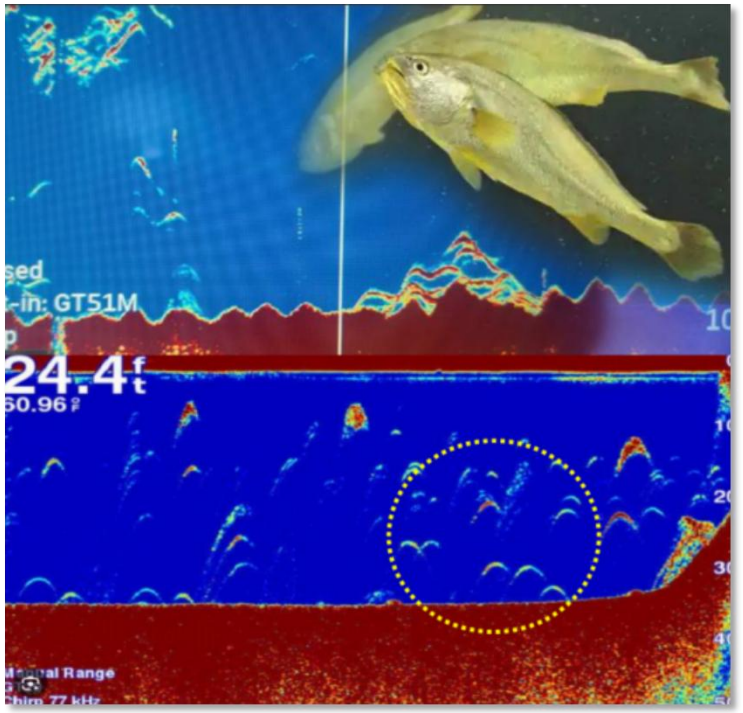
Yellow croakers make an excellent target for fish finders because they possess a highly developed **swim bladder**, which reflects sonar waves back to your screen with a distinctly strong signal. Because they are bottom-dwelling migratory fish that prefer shallow, muddy, or turbid coastal waters (typically between **10 to 60 metres deep**), optimizing your fish finder settings is key to locating them

Recommended Fish Finder Settings for Yellow Croaker

- **Use High Frequencies (200 kHz or High CHIRP):** Because yellow croakers are usually found in relatively shallow bays, river mouths, and coastal areas under 60 metres, a high frequency like **200 kHz** will give you the best target separation. This will help you distinguish individual croakers from weeds or the muddy seabed.
- **Scan at Medium Frequencies (83 kHz) First:** If you are actively cruising to scout a new bay or estuary, switch to **83 kHz**. The wider sound cone allows you to scan a larger area of the bottom more quickly. Once you spot a school, switch back to 200 kHz for precise tracking

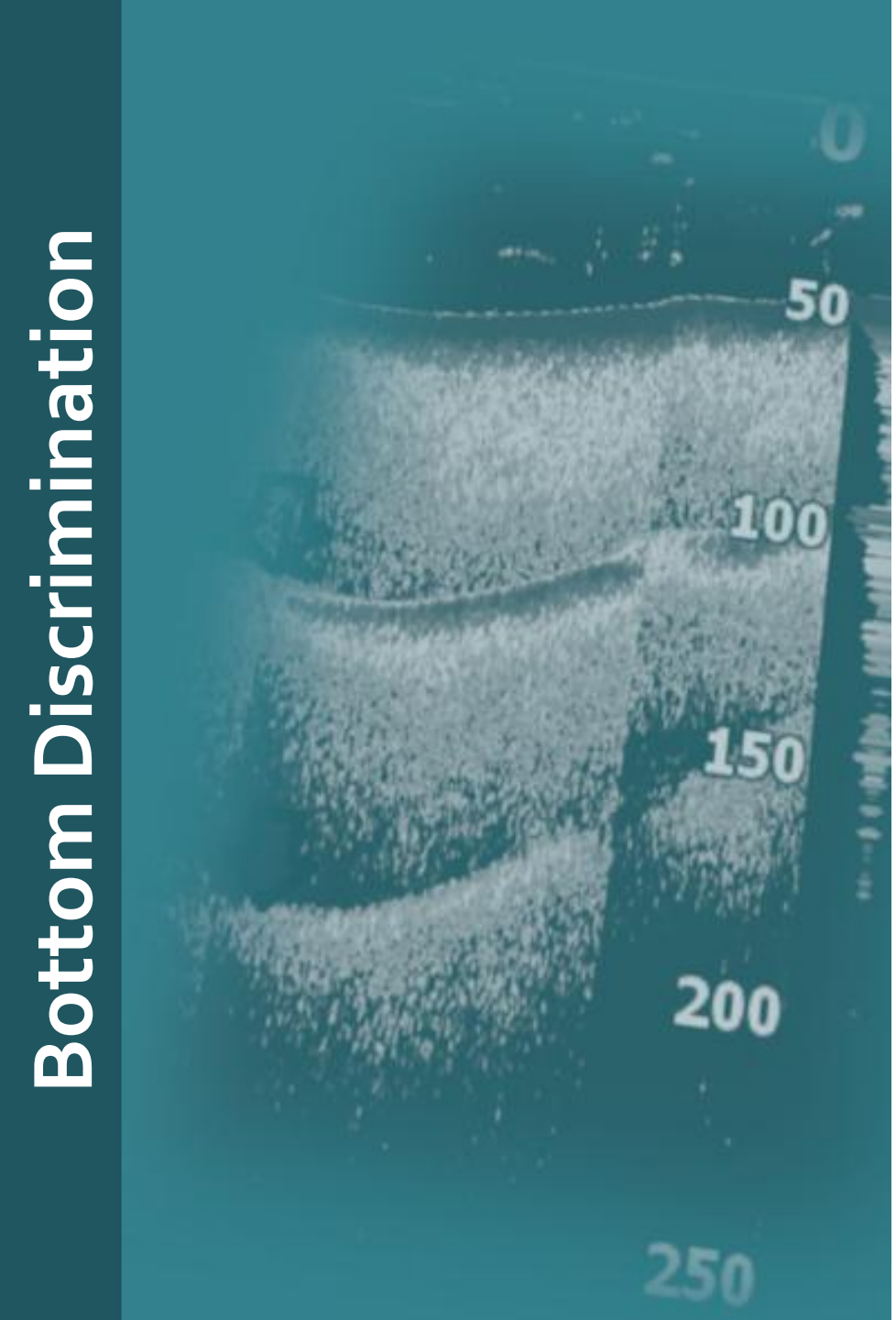
What to Look for on the Screen

- **Bottom-Hugging Arches:** Yellow croakers are bottom-oriented predators. On your sonar screen, look for tight, defined arches or clusters positioned directly along or just above the bottom line.
- **Strong Yellow or Red Echoes:** The swim bladder of a yellow croaker provides a dense target. On most fish finder color palettes, a strong return from a dense target shows up as bright yellow or deep red inside the center of the arch.
- **Spotting Muddy Bottom Transitions:** Yellow croakers love muddy, nutrient-rich sea floors. A hard rocky bottom returns a thick, intensely bright yellow line on your screen, while a soft, muddy bottom shows up as a thinner, darker red or blue-green bottom tracking line. Look for transitions where the bottom line softens; these are prime croaker feeding zones.
- **Time of Day Variations:** Yellow croakers avoid strong light. During the bright afternoon, look for them tightly blanketed right against the seabed. At dawn, dusk, or during night fishing, you will see their sonar arches move up into the middle water layers to feed.



Pinpointing Yellow Croakers: 70kHz/120kHz or CHIRP-M

Bottom Discrimination



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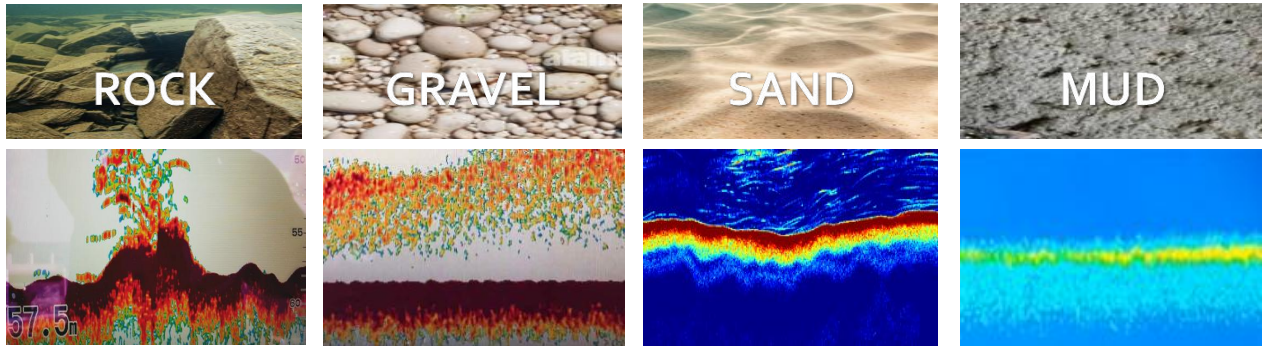
To determine whether the seabed consists of hard rock or soft silt and sand by using a fishfinder, one primarily relies on echo intensity, bottom line thickness, color display and the secondary echo.



For the best view of seabed hardness and bottom composition, switch to the **50 kHz low-frequency** display.

Explanation:

- Low-frequency (50 kHz) sonar beams have a wider angle and greater penetration. Upon striking the seabed, they produce a longer "bottom band" (echo tail)
- The visual contrast between hard and soft bottoms is far more pronounced than with the 200 kHz high-frequency display, making them easily distinguishable at a glance.

Bottom Discrimination | *Rock & Gravel*

Characteristics of Rocky and Hard Seabeds

Rocky and hard seabeds (such as solid rock, hard coral reefs, and volcanic rock) exhibit very strong and distinct echo signatures due to their extremely high acoustic reflectivity.

Strong, Bright Returns:

Hard rock reflects sonar energy exceptionally well. The seabed line on the display appears in the most intense colors (such as bright red, bright yellow, or white, depending on the color palette).
The intense, "hot" dual-colored band (Top Red & Tail Brown) indicates return strength, with red or reddish-brown representing the highest intensity.

- Bright Red Surface (Top Red): The surface of hard ground appears as an extremely bright, smooth, and continuous top line in solid red or bright yellow; this represents the massive burst of energy generated the instant the sound waves strike the rock.
- Dark Brown Tail (Tail Brown): Immediately beneath the red surface layer, a very thick, deep reddish-brown or black "tail" (bottom trail) extends downwards. The thicker and darker this tail, the harder the seabed.

Secondary Echo (Double Bottom Display):

In shallow to moderate depths, a strong sonar signal may reflect twice between the seabed and the boat's hull, causing a fainter yet distinct secondary seabed image—known as a "Double Bottom"—to appear below the primary one.
This is the most reliable indicator of a truly hard bottom, and it is particularly evident at depths of less than 50 meters.

- Visual Representation: A second, identical seabed line—albeit slightly paler in color—appears below the actual seabed line, positioned at exactly twice the water depth.
- Formation Principle: The sonar pulse is extremely powerful; after striking the seabed, it bounces back to the hull, reflects off the hull back to the seabed, and finally returns to the transducer for a second time. Only when encountering extremely hard materials—such as rock—is there sufficient energy to sustain this "double bounce"; this phenomenon does not occur over soft silt or sandy bottoms.

Bottom Topography:

On traditional 2D or side-scan sonar displays, reef areas typically appear as irregular, jagged shapes, sharp protrusions, or chaotic shadow patterns.

- Jagged Features and Sharp Peaks: Reef areas rarely appear flat on the screen. They usually manifest as steep peaks, abrupt drop-offs, and irregular, jagged contours.
- Shadow Zones (Dead Zones): Behind steep reef structures—on the side facing away from the transducer beam—there is often a "pitch-black shadow" devoid of any signal. This occurs because the reef blocks the sound waves, creating a shadow similar to one cast by sunlight.

Thick bottom line:

Due to the strong and prolonged return echoes, the band representing the seabed (Bottom Line / Bottom Band) appears noticeably thick.
When the "White Line" feature is enabled, the characteristics of a hard bottom become even more pronounced:

- The uppermost surface of the seabed is effectively "bleached," transforming into a very thick, highly distinct white band.
- If this white line remains thick and unbroken over undulating terrain, it indicates a continuous stretch of hard rock. This is the ultimate technique used by professional anglers to locate groupers and snappers hiding in rock crevices.

Bottom Discrimination | *Sand & Mud*

Characteristics of Muddy and Sandy Bottoms

In traditional 2D fish finder sonar imagery, soft seabeds—such as mud, ooze and loose fine sand—exhibit extremely high rates of sound wave absorption and scattering. When sonar pulses strike these soft surfaces, a significant amount of energy is absorbed, much like hitting a sponge. Consequently, the echoes returned from soft seabeds appear "soft" and dim; they can be accurately identified by the following four key visual characteristics:

Weak and Dim Returns:

Soft silt and sand absorb most of the sonar sound waves, resulting in very little reflected energy. The seabed appears in darker colors on the screen (such as blue, green, or dark gray). A thin, faint "single-layer band": Unlike the intense dark red associated with hard bottoms, the color and thickness of the return from soft bottoms are significantly reduced:

- Surface line with red, green, and blue hues: The surface line for soft bottoms is very fine, often appearing as just a thin, light red or yellow line. In areas of extremely soft silt, the red component may be absent entirely, displaying instead as green or cyan (indicating a weak return).Little to no intense red: The line representing the mud surface is very faint. Using a standard color palette, it rarely displays the dark red characteristic of hard bottoms, appearing instead as light yellow, green, or even cyan.

- "Two-color" phenomenon: If the mud layer is thick, you may see a faint green line with a hazy, light blue, mottled area beneath it. This indicates that the sound waves have penetrated the soft mud surface and are gradually attenuating within the mud layer itself.

- Extremely short or absent tail: There is almost no "bottom trail" beneath the seabed surface line. The area immediately below the surface line is pitch black or solid blue (a no-signal zone), indicating that the sound waves attenuated and vanished completely upon contact with the mud surface.

Flat & Smooth Line:

The terrain is absolutely smooth—sometimes even creating a visual impression of a slight depression—appearing on the screen as a smooth, uniform, and flat thin line. It represents an extremely flat and even bottom profile.
Silky Straight Line: Silt and fine sand, shaped by water currents, often settle on the seabed much like sand in a desert or on a plain. On the fish finder display, a soft bottom appears as an incredibly smooth, featureless, and near-perfect horizontal line or a gentle slope.

- Mirror-Flat: Muddy bottoms typically form in areas with very slow currents, such as sheltered bays, estuaries, or abyssal plains. On the screen, this manifests as an absolutely smooth, unbroken line or a very gradual, seamless arc.

- No Shadows: Because the terrain lacks abrupt peaks or steep drop-offs, the sonar beam illuminates the area evenly, ensuring there are no "dead zones" (areas of pitch-black shadow) on the display. "Soft" or Hazy Appearance: While the edges of a hard bottom appear crisp and sharp on the screen, the edges of a muddy bottom look somewhat fuzzy, blurred, or indistinct, as if the boundary of the seabed is undefined.

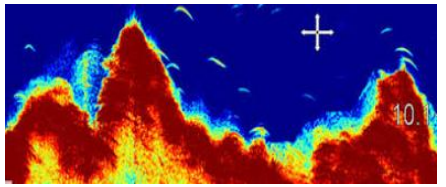
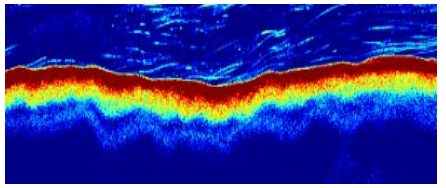
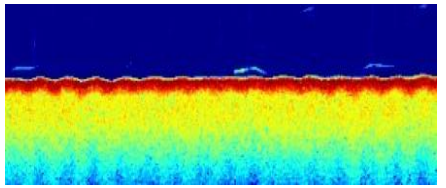
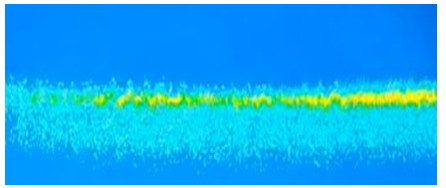
Thin Bottom Line:

The reflected signal is weak, resulting in a very fine, faint band on the display. Characteristics when the "White Line" function is enabled:

- When encountering a muddy seabed, the uppermost white line becomes extremely thin—or even intermittent and barely visible.

- This occurs because the echo signal is too weak to reach the system's threshold for triggering the white display. If the white line nearly disappears, leaving only a thin green or blue line, it indicates that the underlying mud layer is very thick and soft.

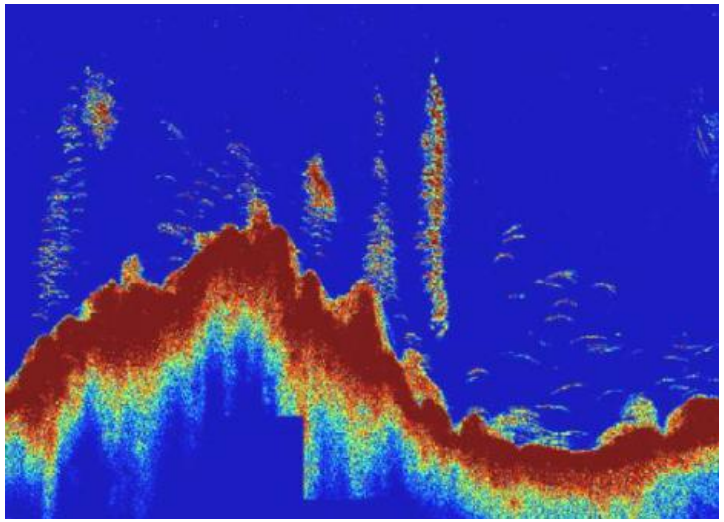
Bottom Discrimination | *Summary*

	Seabed Material	Surface Color	Echo Tail	Topography	Double Bottom	Quick Reference	
	**Rock**	An extremely intense deep red/reddish-brown	Extremely thick and long, extending straight downwards in a deep reddish-brown hue.	Abrupt, sharp peaks and jagged cliffs, often backed by dark shadows.	Exceptionally clear and intense (a perfect mirror image in double the water depth)	Red and thick, with an uneven surface; it is bound to have a double base.	
	**Gravel**	Rough, bright red/orange-yellow	Medium thickness; the bottom is unevenly elongated, resembling a comb or having a burr-like appearance.	Generally smooth, but with dense, microscopic bumps.	Clearly visible, moderate intensity	Rough surface, serrated tail, and microscopic undulations.	
	**Sand**	A bright, pure red that is even and clean.	Extremely thin and short, rapidly transitioning at the base into a yellow or green tail-like tip.	Generally extremely flat, sometimes featuring regular, low-amplitude undulations.	Absent, or faintly and intermittently visible in very shallow water.	Silky red line, extremely short tail, flat as a mirror.	
	**Mud**	Dull pale yellow, green, or bluish-green	There is absolutely no tail; directly beneath the red line lies a stretch of pitch-black darkness.	Perfectly smooth; edges appear blurred or soft.	Absolutely not; it was pitch black at twice the water depth.	Greenish in color, with an extremely thin baseline and a completely black underside.	

Bottom Discrimination | *Fishing Tips*

Why is this a prime fishing spot? This transition zone—or "edge"—offers both the safe cover provided by rocky reefs and the open visibility and diverse food sources found on sandy bottoms. Almost all large predatory fish (such as large groupers and red seabream) favor ambushing prey along the boundary where sand meets rock. Whenever you spot this kind of abrupt change in the seabed composition on your fish finder, mark the waypoint immediately—you won't go wrong.

Locating specific fish species based on the hardness of the seabed is a key "fish-finding secret" among professional captains and expert anglers. Different types of substrates create distinct ecosystems that attract fish species with specific feeding habits and camouflage needs.
Once you have identified the bottom type on your fishfinder, you can use the following "seabed hardness guide" to pinpoint your target fish:



Reef Areas (Rock) — Targeting "Structure-Oriented Predators"

Reef areas feature complex, uneven terrain with natural crevices and current shadows. These are prime hotspots within the food chain.

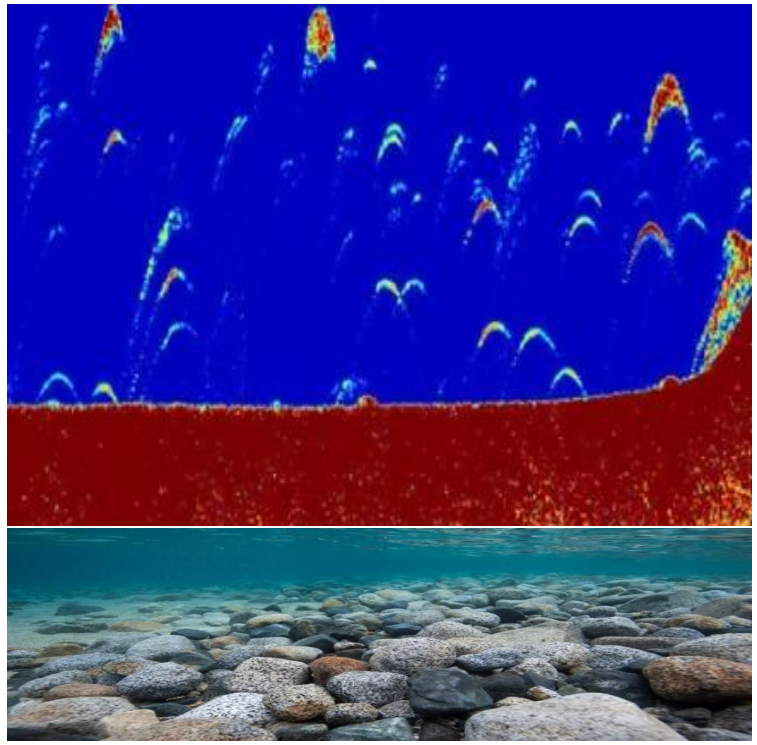
Target Species:

- Resident bottom-dwellers: Grouper, Snapper, Redfish, Rockfish.
- Migratory predators: Amberjack, Sea Bass, GT (Giant Trevally).

How to Locate Them:

- Focus on the "lee side" (sheltered side): When currents strike a reef, a calmer "back-eddy" zone forms behind it (often appearing as a "shadow" or dead zone behind a raised structure on a fish finder). Groupers and snappers prefer to lurk at the edges of these shadow zones, waiting for the current to sweep small fish and shrimp their way.
- Observe the reef pinnacle: Migratory species like Amberjack or Sea Bass typically do not hug the rocks themselves; instead, they hover in dense schools above the reef's peak (appearing as a cluster of "fish marks" or a cloud-like formation above the pinnacle on a fish finder).

Bottom Discrimination | *Fishing Tips*



Gravel Zones — Targeting Bottom-Feeding Fish

Gravel areas—a mix of crushed stone and shell fragments—harbor abundant worms, small crabs, and shrimp, earning them the nickname "underwater buffets."

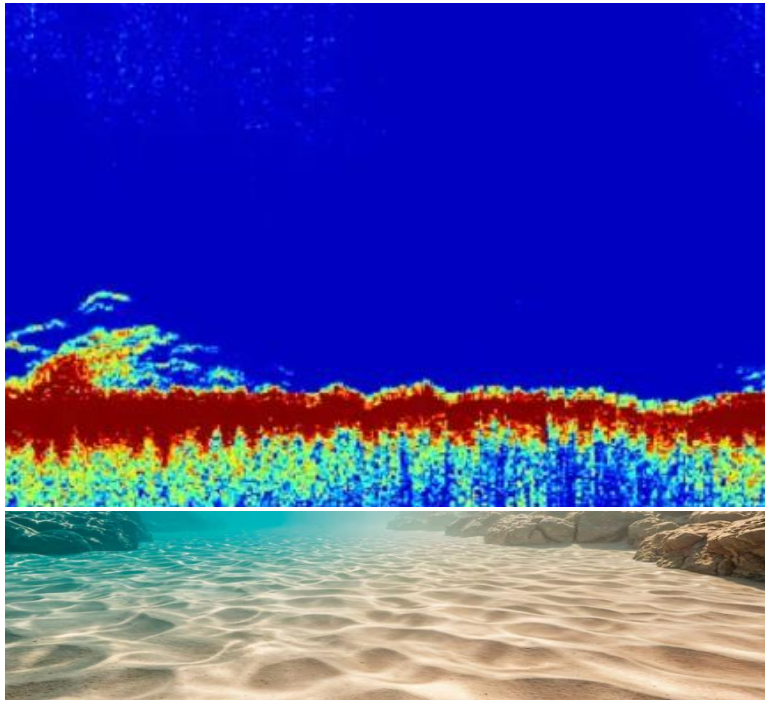
Target Species:

- Red Snapper, Black Porgy, Yellow Croaker, Tilefish, and some Sea Bass.

How to Locate Them:

- Look for isolated signals amidst the "fuzzy" bottom return: Gravel beds are generally flat, and fish here tend to be scattered rather than schooling in tight clusters as they do around reefs.
- Enable the "White Line" feature. The actual gravel seabed will appear bleached; if you spot small, isolated red arcs or intermittent red dots immediately above the white line, these are likely Red Snapper or Black Porgy foraging along the bottom for shellfish.

Bottom Discrimination | *Fishing Tips*



Sandy Bottoms — Targeting "Camouflaged and High-Speed Fish"

Sandy areas are clean, flat, and offer wide visibility; the fish found here are either masters of camouflage or capable of high-speed swimming.

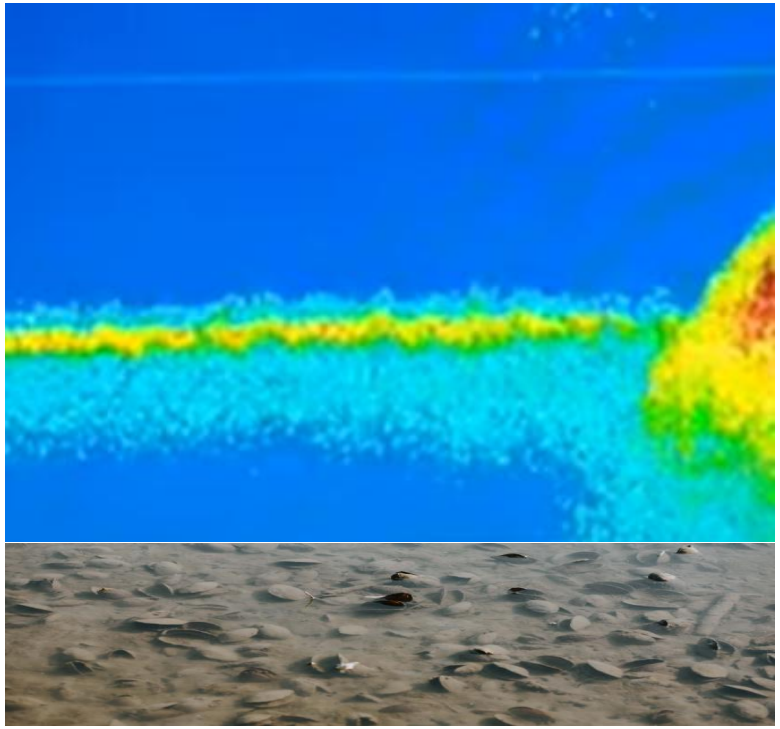
Target Species:

- Camouflaged/Ambush Fish: Flounder/Flatfish, Flathead.
- High-Speed Pelagic Fish: Whiting, Mackerel (chasing sardines above the sandy bottom), and certain species of Trevally/Jack.

How to Spot Them:

- Look for "small bumps" right against the seabed: Flatfish (like flounder) often bury themselves in the sand. On your fishfinder, the sandy bottom usually appears as a smooth red line; if you notice a tiny, irregular red dot or small protrusion appearing on that line—something smaller than a reef—it is very likely a large flounder.

Bottom Discrimination | *Fishing Tips*



Muddy Bottoms — Seeking Nocturnal and Burrowing Creatures

Although muddy bottoms may appear barren, they are a haven for many light-averse, burrowing organisms.

Target Species:

- Eels, hairtail (cutlassfish), certain shrimp and crabs (such as tiger prawns), mantis shrimp, and tilefish (which build burrows in deep mud).

How to Locate:

- Fish inhabiting muddy bottoms are mostly active at night or remain hidden within mud burrows. During the day, a fish finder will typically display a clean image over vast stretches of featureless mud (often appearing green with no "tail" or trailing return). Look for tiny depressions in the mud, or revisit the area at night; eels and shrimp emerge from their burrows, creating a faint, scattered signal layer just above the bottom.

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