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Hands Off:

A Review of Today's Research Landscape and the Modern Tools That Don't Require Fish Handling

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The need to understand fish behavior, movement, and population dynamics is growing, but the ability to conduct direct research is more limited.



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Even advanced methods like telemetry require fish handling and tagging

The ability to achieve your research, monitoring, or conservation goals is not just asking the right question, but knowing the tools available.

Snorkeling or Diving Cost – inexpensive

Benefits – minimal harassment, readily mobile, experienced snorkelers offer excellent fish ID, distribution, abundance estimates, and behavioral observations.

Challenges – limited by visibility, only appropriate in shallower environments, requires good planning to have statistical support, possible safety considerations. **Mobile Underwater Monitoring – GoPRO**

Cost – relatively low (\$100's)

Pro's – Can be quickly deployed Monitor behavior Can be either stationary or mobile

Con's - Limited battery life Must be retrieved to view Doesn't perform well under dark conditions Not generally for counting fish Fixed video monitoring Cost – Moderate to high depending on setup

Pro's - Improved camera technology Wider viewing angle Better infrared lighting Motion Detection Software

Con's – Significant infrastructure Lighting for night Limited by turbidity and debris Significant time for reviewing data. Video Monitoring Chute

Live Trap

Stream Flow





Cost – Moderate to Expensive (\$30k to over \$100k)

Pro's – Count, measure, identify all passing fish Works reliably well in most conditions Provides a robust dataset for timing and passage

Con's – Installation is somewhat complex Requires moderate upkeep, data downloading, camera cleaning Operating the system requires experienced technicians Equipment manufactured in Iceland

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Cost – Expensive (\$80k to buy \$15k-20k monthly)

Pro's – Uses sound to see

Video output can be collected in absence of light or high turbidity

Can 'see' long distances (30-100ft) Document fish behavior and presence in challenging environments

Con's – Upfront cost can be prohibitive Requires experience to interpret the videography Does not operate well in aerated water Requires a stable platform or mount

Adaptive Resolution Imaging Sonar (ARIS)

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Adult Holding



Cost – Low Cost (around \$200 a sample), \$6k per assay.

Pro's – Rapidly identify if a species was present Confirm presence/absence of species in area of interest Excellent for documenting rarer species

Con's – Relatively new approach to survey Latency of DNA is uncertain Stronger findings in non-flowing habitat







Drones (UAV)



Cost – Relatively Low Cost For Rapid Deployment

Pro's – Conduct surveys quickly Obtain low-elevation aerial imagery or elevation data Develop 3-dimensional models of terrain

Con's – Best suited for small to moderate areas Labor can approach fixed wing traditional methods for large areas Mission planning is required to safely and effectively operate



We're Here to Help

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