Molecular methods workgroup

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A need for the molecular methods workgroup

- Molecular methods are becoming **increasing popular** in environmental monitoring and bioassessment applications.

- The rapid evolution of the DNA field has resulted in a **lack of clear guidance** on best practices for generating molecular data.

- There is a need for **improved communication** among researchers to build consensus on methods and enhance collaboration.

- California can be a leader in establishing **recommendations and guidelines** for using molecular methods in environmental monitoring.
My charge:

1. Develop a charter for a new Molecular Methods workgroup
2. Determine key objectives and potential Workgroup products
3. Propose potential Workgroup structure and membership
Molecular Methods Workgroup charter

- In collaboration with Nick Martorano, Kris Jones, Nicole Hack
- “The mission of the Molecular Methods Workgroup is to serve as a clearinghouse for key technical and programmatic guidance on the use of molecular methods for bioassessment and environmental monitoring programs in California…”
Objectives

• **Consensus-building**: Identify and provide recommendations on best practices for molecular methods including sample collection, sample processing, and analytical pipelines. Identify key technical challenges in generating DNA-based data to prioritize further research, as well as discuss emerging molecular methods and their potential utility in monitoring applications.

• **Communication**: Provide online resources for communicating molecular results to management communities and water quality managers to enhance the interpretation and efficacy of molecular data.

• **Coordination**: Improve coordination among research groups, sampling programs, and monitoring agencies to enhance collaborations and minimize redundancies in sample collection.
Potential products from Workgroup

1. Primer on molecular methods
   a. What is the difference between qPCR/eDNA/metabarcoding?
   b. What tool is appropriate for my application?

2. Inventory of DNA sampling and research efforts across the state
   a. Help to coordinate researchers
   b. Reduce redundancies in sampling efforts
   c. Better understand frequency and types of methods in use across State

3. Field sampling protocols

4. Data management
   a. Workgroup website as digital resource for recommended protocols
   b. Best practices for data management, templates for data archiving

5. Performance guidelines
   a. Bioinformatic recommendations for reproducibility
   b. Standards for the use of positive and negative controls
Charter: Structure

• Larger workgroup
  • Comprised of key agency and user community members
  • Discuss recommended protocols and sampling requirements with an eye towards implementation and regulatory workflows
  • Provide recommendations to technical workgroup on key implementation challenges

• Technical workgroup
  • Comprised of technical experts, practitioners, academics
  • Build consensus on sampling protocols and analytical methods
  • Develop suite of guidelines for generating and analyzing DNA data and provide recommendations to larger workgroup
  • Discuss emerging technologies and application to environmental monitoring

Example members:
• SWAMP
• Cal EPA
• CADFW
• DNR

Example members:
• UCLA CAleDNA project lead
• Smithsonian DNA library project team
• US Bureau of Reclamation fish biologist
Feedback

1. Is this structure (larger workgroup and smaller technical workgroup) the best approach for the molecular methods workgroup?

2. How is membership determined?
   • Can anyone join, or invite-only?

3. What organizations and personnel should we be approaching to be involved? (email me your ideas!)
Bonus slides
# Membership

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<tr>
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<td>UCLA (CALeDNA)</td>
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<td>Holly Bik</td>
<td>UC Riverside</td>
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<td>Josh Israel</td>
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Generating DNA data

Sampling → DNA extraction → DNA analysis → Bioinformatics → Taxonomy ID → Biological data