

ARD Staff Typical/Current Activities

- **CERCLA**
 - **Sediments that have been contaminated by releases of CERCLA subatances**
 - **Removal and remedial**
- **OPA**
- Oil Spills
- Chemical Spills
- Ship Groundings
 - Groundings in Coral
 - Pacific Islands
 - Often related to or a potential oil spill
- Waste Sites
 - chronic
 - acute
 - remediation and toxicity
 - **Large hazardous waste sites**
 - **Risk and Injury Assessment**
 - **Restoration Opportunities**
 - **Contaminants of Concern**
 - **Contaminant Effects**
 - **Toxicity assessments**
 - **Tissue residue effects**
 - **Example Cases**
 - **Hudson River (NRDA and remedial)**
 - **Passaic**
 - **Berrys Creek**
 - **Newtown Creek**
 - **Cosco Busan**
 - Small and Medium Cases
 - Site assessment
 - Preliminary
 - Risk – Ecological Risk Assessment
 - Injury
 - Damage
 - Settlement Negotiations
 - requests for information and general outreach (public, academic, other govts, NGOs, co-trustees),
 - remedial & restoration monitoring
 - **Example Cases**
 - **Alcoa Grasse River remedial**
 - **Troy Chemical (remedial will be proposed to NPL Nov 2013)**
 - Raritan River watershed

ARD Staff Typical/Current Activities

- Marathon Battery – marsh restoration under the remedy NL NRDA – initial effort could begin 2014
 - Restoration of Housatonic River in CT
 - Urban watershed restoration and planning
 - Portland Harbor
 - Regional Clean-up
 - Duwamish
 - Port Angeles Harbor
 -
- evaluation of natural resource injury for resolution of claims within global settlement context
 - assessment
 - pathway evaluation
 - injury determination
 - restoration project development, and scaling damages;
 - identify/develop restoration projects to compensate public for losses to navigation and transportation services
 - commercial and recreational fisheries, and supporting habitats
 - assist in developing Consent Decree and supporting documents
- Restoration
 - examples: dam removal, fish passage, habitat equivalency analysis (HEA)
 - habitat mapping/classification - gulf of mexico example for ranking/prioritization
 - monitoring and other data involved.
 - **Restoration projects database**
 - Lakes Restoration Initiative activities
 - OR&R both generates and manages data under this initiative
 - evaluate potential injury and to show status and trends
- Partnerships with EPA and states
 - coordinating, developing, and implementing multidisciplinary proposals and remedial and removal investigations
 - monitoring well placement/design/construction
 - sampling plans
 - health and safety plans
 - community relations plans,
 - contaminant extent and magnitude
 - contaminant fate and transport
 - risk assessments
 - cleanup criteria development
 - feasibility studies
 - proposed remedies
 - remedial and removal design plans
 - response action implementation
 - long-term monitoring, evaluation and oversight of mitigation and restoration activities necessary to resolve site related injuries
 - community relations

ARD Staff Typical/Current Activities

- legal documents
 - Identify and evaluate cost-effective strategies to reduce injury to natural resources and sensitive ecosystems
 - negotiate with responsible parties
 - coordinate with EPA and co-trustees to maximize restoration of natural resources by integrating restoration into the remedial process.
- Planning
 - Arctic
 - NRDA
 - Oil Spill
- Technical support
 - NRDA
 - Remedial
 - Analytical Chemistry Database Systems
 - QA&QC
- **DWH**
 - **Case work**
 - Analytical data management
 - Analytical data management contract
 - Contracting – oversight – contract representatives
 - Have been interviewed by RC staff on restoration for DWH and monitoring data
- National projects such as development of models predicting sediment toxicity from sediment chemistry
- Contracting
 - General contract management
 - ARD General Watershed data management contract
 - contracting - oversight - contract representatives
 - statements of work for any projects needing contracts/grants
- General Administrative activities,
- Incident - oil or chemical spill or ship grounding
 - making maps -
 - trajectory - where is oil
 - operational
 - observations of oil in the environment (photos, field, SCAT, overflight, wildlife)
 - information management
 - display of information
- Incident - extreme weather event
 - hurricanes
 - marine debris
- Training and exercises
 - field sampling
 - tools and technology
 - drills and exercises

Questions to initiate the Scientific Method

- What questions do we need to ask from a higher level?
 - if you take all from cradle to grave – best way to capture is to conceptually walk through a case and see what types of questions we ask
 - What types of questions need to be asked from the following perspectives:
 - Engineering?
 - Cost?
 - Technical?
 - Legal?
 - There are a myriad of case types we deal with and while there are basic questions you don't really know until you know some characteristics of the case.
 - **Questions vary depending on response/ injury assessment phase, how much time you have, and whether using existing data or designing data collection, or a combination**
 - hard to know what is missing in laundry list – depends on where you are in the case – depends on case type –
 - The science questions I ask are very broad, since they are not for a specific case, and are intended to help focus our planning efforts. Some examples of broad science questions that I am looking at are:
 - **What are the exposure and injury endpoints for resources at risk of being impacted by an oil spill in the arctic that should/could be studied for NRDA in the event of a spill?**
 - ensuring response actions will control source and remove residual injury (ultimately, though may be initially risk-based),
 - Does sediment/tissue/water chemistry provide information that can be used in source identification?
 - Which of these endpoint are the highest priority (in terms of maximizing potential injury quantification and restoration) for ephemeral data collection?
 - What is the variability in these endpoints? and how can we achieve desired power to detect effects (comparing to baseline and/or comparison sites)?
 - Things that arise to drive the case are:
 - Legal questions arise
 - sometimes we evaluate, and analyze regs and statutes and present interpretations to DOJ in order to build a case
 - keep in mind to a large extent we are thrown into a regulatory science framework rather than a strict science
 - Common Questions
 - How are we determining our strategy?
 - what is feasible within the response or SOL timeframe?
 - what is the appropriate scale; are response and restoration efforts achieving targeted goal--if not how can actions be modified

Questions to initiate the Scientific Method

- What types of restoration are practicable to compensate for site-related injuries;
- what projects are available in the appropriate timeframe;
- Have NOAA trust resources been injured? (**Do we have evidence of exposure?**)
 - For how long
 - What potentially affect resources are present
 - **What is our injury to trust resources (or what is the ecological risk)?**
 - **How can we measure exposure to trust resources?**
 - **Have we exceeded identified thresholds?**
 - What concentrations would be protective of NOAA trust resources?
 - Do we have baseline information about the resources?
 - **What are the primary contaminant exposure pathways to resources of concern? What is the fate and effects of contaminants in the system of concern? What is the potential for adverse biological effects and measures of injury?**
- **What are the levels of toxicity that cause effects (acute and chronic) in various species**
- What information is needed to answer the questions at hand?
- What additional data is needed?
- Can data acquisition be combined with current or already planned data collection efforts in a defensible manner?
- How do I account for climate change in my long term planning?
- **What information do I need for sampling design, field sampling plan (temporal relevance, data quality objectives)**
 - Will data collected under a given sample plan support be representative of the parameter being measured?
 - will sample plan provide enough power to support testing conclusions?
 - are planned sample locations appropriate?
- **How do I collect and manage various field information (examples: chemistry, observations, non-analytical, physical, bile)**
- **What is my Spatial reference (datum, coordinate system)?**
- **Do I have metadata about information so it can be used for analysis (when collected & source)?**
- **What spatial analyses may help?- generalize from samples to larger area (interpolation)**
- What does they data look like on a map?
- Contamination
 - Are natural resources exposed to hazardous substances?
 - Can adverse effects to natural resources be measured as a result of exposure to hazardous substances?
 - **what level of contamination will be left behind by cleanup?**
 - **what concentration best represents sitewide contaminant concentrations?**

Questions to initiate the Scientific Method

- What type of contamination are we dealing with? (What contamination is present?)
- How do I account for background contamination and multiple stressors?
- What is the geographic extent of the contamination?
- Get samples if possible, or records of discharges.
- Can the contaminant(s) in the affected areas be linked to a source or sources?
- what samples are needed to prove pathway?
- Are there confounding contaminants / sources?
 - Get samples or records of other discharges
- **Can we get data to show resources have been exposed?**
- What are adverse effects that can be caused by contaminants for each resource, at what concentrations?
- Are levels of contamination high enough to cause injury based on literature toxicity values? (includes water or sediment concentrations, concentrations in prey, and potential to bioaccumulate or biomagnify contaminants)
- Can adverse effects be measured amid natural variability?
- Are there dead / injured organisms? gather; can we test them to show cause of death or injury?
- **What are the potential secondary adverse effects of the contamination (e.g. ecological interactions that affect organisms higher in food web). Can we scale impacts?**
- What is the categorical severity of contamination?
- Do measured variables (e.g. abundance, cover) within a given categorical severity class differ compared to baseline or control?
- **What background data is available for these endpoints of interest in Arctic resources?**
- What is the difference between impacted areas and control areas for a given measured variable?
 - What are appropriate and defensible quality control measures for sample collection that deviates from standard protocols?
- Have hazardous substances been released?
- Is the analyte/parameter list appropriate?
- What are/were the target receptors--are they appropriate?
- Are there Contaminated sediments?
 - **What do we estimate historic sediment, water, tissue data were for data gap years based on current data and estimates of sediment deposition rate, decay rates, changes in source conditions, etc. comparisons of remedial alternatives- how reasonable are the projections developed by a PRP or EPA?**
 - are sediment/tissue concentrations declining, remaining same, increasing? what is the filtering capacity of mussels in a given area?

Questions to initiate the Scientific Method

- **how best to evaluate uncertainties how to manage data? deal with missing data? what data is required to answer questions What is the nature and extent of contamination in sediment and biota?**
- NRDA
 - one of the first questions should be – “is restoration even possible?”
 - This is one of the criteria for moving forward.
 - What restoration can be done to compensate for injury?
 - How much?
 - For how long?
 - what types of restoration are we targeting?
 - What are the opportunities?
 - Have opportunities been identified?
 - How can we assess/monitor & scale? benefits? can they be implemented?
 - **how many acres are impacted/benefit gained by action? what are the trends in biomonitoring data?**
 - **what are the benefits of a proposed restoration project?**
 - **which resources/species best represent the site as a whole for quantifying injury?**
 - **how long will natural recovery take?**
 - **Is site risk/injury greater than natural variability**
 - **What is the estimated rate of recovery with or without remediation?**
 - exposure/pathway
 - sub-questions to identify exposure
 - documenting exposure –
 - commonly think will get from Response but that's not necessarily true.
 - quantify exposure
 - identifying resource(s) at risk
 - How are they getting impacted (physical pathway, dermal exposure).
 - Are there pathways that may result in exposure to natural resources?
 - What are the sublethal impacts, how can they best be measured and how do they translate to percent service loss.
 -
 - injury
 - population?
 - information on resources being assessed? are they present?
 - Can we translate the data collected during the assessment into injury? These are all pretty standard / generic.
 - On small spill cases uncertainty estimates and the negotiation is as important as the data.
 - what is population trend?

Questions to initiate the Scientific Method

- other biologic info on resource
- depends on resource
- size of event
- chronic waste site vs. spill
- assessing past and residual injury—
 - what are receptors, contaminant-residue effects concentrations, component sources--viz., contaminant fate and transport—
- physicochemical properties affecting bio-uptake, concentration, magnification—
- foodweb; contaminant extent and magnitude intersection with receptor home ranges and preferred habitats during various life stages;
- **what are the ecosystems services provided by a given habitat before and after an action?**
- TOC, lipid normalization; site-specific tox data--were controls appropriate--was the study design robust enough (pwr) to merit analyses; sed/soil/ water screening value comparisons—
 - again, how these are used and the questions that follow are often determined by available time/resources
 - decision tree will dictate the questions under the specific scenario
- **what is the PCB or dioxin congener pattern in fish vs water vs sediment vs soil? Has it changed over a spatial or temporal scale? how to predict fish whole body tissue concentrations from fillet concentrations or vice versa especially if don't have site specific lipid data?**
- Other Questions
 - How do DQOs for existing data align with current question set?
 - are GW wells constructed properly
 - DWH specific questions are a different question and not as related to daily ops.
 - **What is the spatially averaged surface/subsurface sediment concentration?**

Economic questions

- how do we value resources/affected resources those sorts of ideas – from surveys of people
- looking for metrics that would indicate losses –
- instead of abundance of cover – very case specific as to what approach – reveal preference, direct losses or if we try and value
- start off and think what component of human losses are measurable
 - human use survey
- do we need to collect data or is there existing data we can leverage

Questions to initiate the Scientific Method

Legal Questions that affect approach

- how do we allocate injury to various parties
- what does case law say about how we do things
- what level of certainty do we need to have, etc.

ARD Data Sources

Other case team members

EPA

Probable Responsible Party/ Responsible Party

Field work

Consultants

Query Manager

Values from literature

Google Map/Earth

Internet Search (Google)

Toxicity Search

Google Scholar

Difference between getting data from EPA project manager (ECOTOX)

USACE Tissue Chemistry DB

Specific external gov't databases that we go to

National Status and Trends (NOAA)

other consortiums (SFEI)

European Databases, particularly for international cases

American Petroleum Institute (API) database

Census

NPS Data

Cal spill watch – OSPR

Facebook page communicating out initial information.

- Get email with alert takes to Calif. Facebook page.
- Not numerical data but information (photos, maps)

CA state toxic site website “GeoTracker”– has links to sites and data;

Water Boards.

- Mainly document management (electronic data may mean PDF)
- copies of permits

Other data portals for NOAA?

CSC data explorer (charts from OCS)

Sanctuaries

- have own ways of managing data
- local sanctuaries have data collection/storage
 - (Gulf of Farallones) as beachwatch with historical data transcribed to digital.
 - Geospatial and queryable.
 - Use for baseline conditions before/after spill.

ESI maps used (product)

spot trackers (safety and can verify locations- accountability)

ARD Commonly Used Data Types & Sources

- **environmental-contaminant chemistry**
 - sediment
 - soil
 - tissue
 - oil
 - water (ground and surface)
 - toxicity data
 - Mortality
 - sub-lethal endpoints
 - genomics
 - DNA sequences
 - When large amounts of data are generated/collected
 - how we manage is important
 - evidence of presence of contaminants at site(s) being investigated
 - biota
 - other samples
 - analysis
 - Analysis / interpretation of investigations,
 - Necropsies
 - fingerprinting of samples
- bioassay/toxicity samples
- biomass (how much stuff falls on a plate, stuff from a tow)
- bio-diversity (whatever)
- bioassay/toxicity samples
- biomass (how much stuff falls on a plate, stuff from a tow)
- bio-diversity (whatever)
- habitat
 - substrate
 - grain size
 - vegetation
 - soil-sediment type
- contaminant tissue-residue effects
 - literature
 - site-specific
 - conventional parameters
- Supporting Chemistry
 - TOC
 - Size
 - weight
 - Age
 - Sex
 - Reproductive condition
 - Lipids
 - Size
 - weight

ARD Commonly Used Data Types & Sources

- Age
 - Sex
 - Reproductive condition
- instrument
 - CTD
- evidence of release
 - physical samples
 - results of sample analyses
 - photos
- Response records such as SCAT reports
 - Categorical classification of oiling levels along shorelines
- Physical/Environmental parameters
 - Temperature
 - Wind
 - Storm surge
 - Tropical/hurricane
 - Wind
 - Radar
 - precip
 - CTO
 - CTD
 - Buoys
 - Fluorescents
 - Data captured under the water
 - dissolved oxygen
 - Organic Carbon (what is always there vs elevated)
 - currents
 - turbidity
 - UV light penetration
 - Salinity
 - Mined data from other sources (NOAA and others)
 - Weather (NWS)
 - Remote sensing
 - Tides
 - UV penetration
- FCA
- Topography
- Bathymetry
- flow velocities (seasonal and episodic)
- river stage
- Hydrography
- Nav channel—raster
- Shoreline
- ESI
- ESN
- land cover

ARD Commonly Used Data Types & Sources

- land use
- internal site boundary delineations
- stream barriers
- construction material/labor costs
 - engineering efficacy
 - cost efficiency
- case documents/references
- cost doc data to support strategy and recovery
- Data is high quality
 - contaminant data collected under DQOs w/ agency oversight
 - QCed goes into QM
 - site-specific bathy data collected under DQOs
 - layers from USGS/EPA/RPs under oversight
 - contour maps
 - state GIS shops
 - manufacturing and industrial processes with respect to uses of specific chemicals/compounds
 - **Sediment, water, tissue, Maybe study specific data**
 - depends on the case
 - Documents
 - Data sheets etc. gps data etc. toxicity data?
 - DWH it's maintained externally but not smaller cases.
 - key references? more KMS but related to you guys.
 - **sediment chemistry and sediment toxicity**
 - **(QM, remedial agencies, PRPs)**
 - **injury study results (e.g. fish tumors)**
 - **(remedial agencies, cotrustees, PRPs)**
 - **Environmental parameters when samples were collected**
 - **Concentration values over time and space**
 - **descriptions/maps of proposed restoration projects**
 - **(PRPs, local organizations)**
 - **Restoration opportunities**
 - **contaminant toxicity data**
 - **(scientific literature, site-specific studies)**
 - **<Chemistry data>**
 - **Physical, biological (e.g., habitat) data, etc**
 - **biological evaluations of resources**
 - surveys of sites to enumerate organisms
 - condition of organisms including presence of contaminants on/in organisms
 - acoustic
 - Animal Tags
 - Telemetry
 - Satellite
 - Distribution and abundance data for plants and animals likely to be impacted by a release.

ARD Commonly Used Data Types & Sources

- Includes historical data and data collected specifically for a given case.
- Categorical or continuous
- interactive maps
- Geospatial boundaries
 - Sanctuaries
 - fish advisories etc.
 - geopolitical and resource specific areas
- Effects levels
 - Threshold levels
 - TRVs, etc....
- **Data on resources at risk**
- **Baseline data about resources and chemical characterization**
- Baseline information about other potential sources of contamination or environmental stressors Information about methods
- modeling and data use in NRDA
 - This data comes from a wide range of sources and varies widely in its format, quality, relevance, geographic scope, etc.
- Photos
 - site photos
- Aerial imagery
 - Lidar
 - Satellite
 - Aerial photography
 - elevation surveys
 - other things not in a standard excel spreadsheets
- historical data
 - (looking at footprints from industry to data on past usage to any range of historical data – what was the use 30 years, 50, 100 years ago)
- human use
 - subsistence harvest data,
- Species Abundance data, baseline covers a huge spectrum of data – would take forever to list everything
- Lists of responsible parties
 - contact info
 - public meeting participants and contacts
 - legal precedence
 - digital files of public meetings
 - (for Fed register)
 - Mass media releases, tribal council meetings and consultations
- NGO watershed analyses and reports
- Remedial footprints/plan information EPA
 - might not always be in GIS
- Inundation analysis
- National surveys that we point to

ARD Commonly Used Data Types & Sources

- MRIP (NMFS)
- NSRE
- national survey of fishing hunting, etc (FWS)
- there are more but these are the big ones
- National maintained data bases
 - EMAP
 - stated databases
 - fisheries independent databases
 - fisheries databases
 - Mussel databases
 - NST (national status and trends)
- Lists of data used in similar cases in other regions (need better insight on this)
- Lists of contacts for certain types of cases
- Economist Data
 - Surveys
 - Human use
 - Models
 - HEA calculations
 - Recreational use data
 - lifeguard counts at a beach
 - car counters at beach entrance points or on the ground surveys we've done
 - photos
 - census demographics
 - American community survey on
 - Income
 - population, etc.
- Administrative Data
 - Budgets (need software)
 - Time (need software other than web T&A to be effective)
 - Reimbursement tracking
 - Cost documentation
 - Contracting management

ARD Data Management Toolkit & Primary Usage

Tools for Data Management

- Query Manager (online)
- Query Manager (desktop)
- Query Manager (database)
 - Visual FoxPro
- Excel Spreadsheet
- Microsoft Access
- Google Earth
- ArcMap
- Quantum GIS (QGIS)
- File Cabinet
- Stacks on my desk
- Computer Harddrive
- STATA
- GAUSS
- Garmin Mapsource
- Doodle Poll
- Visual Hea
- HEA Spreadsheets
- HEA spatial tool
- Wiki
- Google Docs
- Online Photologger
- Desktop Potologger
- GPS Photolink
- Trac

Tools for Data Analysis

- DIVER
- Query Manager (online)
- Query Manager (desktop)
- Statistical Analysis Software
 - SAS
 - STATA
 - S (contractors)
 - R (contractors)
 - SPSS
- Sample Design
- Interpolation
- Excel
- ERMA

ARD Data Management Toolkit & Primary Usage

- ArcMap
 - Spatial Analyst Extension
 - Geostatistical Analyst Extension
- Access
- Endnote

Tools for Data Visualization

- Google Earth
- Google Map
- ESRI ArcMap
- MARPLOT
- CSC Sea Level Rise Tool
- Graphic Software
- ArcGIS online
- AOOS
- Mussel watch
- CSC data displays - digital coast
- Sea level rise viewer
- Nautical chart viewer and download app
- Shorezone
- LOSDMS – LOSCO data management
- gulf spill restoration sites – data portal type for DWH
- Cal Spill Watch
- Responselink

ARD Data Analysis Methods

- HEA calculations
 - Mapping of HEA
 - Scaling
- Organizing and tagging of photos and videos
- QA/QC (bad data, duplicates)
- reporting out categorical data (habitat types, assessment/status of targets, response metrics)
- trending
- charts/graphs display (pie charts, line graph)
- Comparison of field collected data with controls
- Lab analysis of field samples
- Response curves LCx (20,30,40, etc)
- Fingerprinting of samples
- WOE--cleanup level derivation
- Mass-balance Modeling
- Plotting data – trends over time (e.g. marsh)
 - Historic distribution mapping
 - General Additive Model (GAM)
- visualizing meaningful numbers (maps, tables, intervals)
- Mapping
- spatial analysis
 - depending on data you draw a space and analyze within space
 - correlations (proximity, joining)
 - interpolations
 - digitization
 - visualization
 - geo-processing (buffers)
 - cartography
 - interpolations like kriging or area weighted averages
 - mashing layers into one spatial context
- ecological risk assessment
 - food web modeling
 - stock assessment
- Animal behavior
 - not an easy answer for examples
 - predator prey interaction after exposure to contaminant
 - avoidance behavior after exposure
 - burrowing behavior after exposure
- Statistics
- Population modeling (contractors)
 - looking at trends over time
 - survivability of species
- hot-spot analyses in support of removal
- Monte Carlo analysis

ARD Data Analysis Methods

- RP using (example - also others)
- Types of statistical analysis
 - parametric/ non-parametric t-test
 - ANOVA (parametric and non-parametric)
 - Linear Regression
 - Co-variant regressions
 - Multi-variant analysis
 - Cluster analysis (hot spot?)
 - Principle component analysis
 - Nearest Neighbor
 - Computing thresholds
 - Power analysis for sample design (statistical)
 - model fit statistics (eg root mean square error, etc)
 - Box and Whisker Plots
 - Mead
 - Standard deviations
 - cluster analysis approach
 - ordination techniques
 - various logit specifications
 - restricted to stats packages GAUSS or Matlab,
 - descriptive statistics
 - Distribution testing and looking at outliers (treating)
- summarizing literature (e.g. swim speeds, oxygen uptake)
- cost
 - for both response and restoration actions
- all appropriate QM queries exported to spreadsheet for additional analyses;
 - lots of data exploration using QM/Marplot to refine questions and subset data for detailed analyses in AV
 - QM-Direct used to conduct rapid on-the-fly analyses during meetings--no other tool has this capability.
- Decision analysis (not statistical) NRDA cases
- decision tree
 - the specific analyses conducted are dictated by project phase, available time

ARD Tools Needing Attention

DIVER

- I find I do not always follow the flow of steps for running queries correctly
 - it makes sense when I watch someone else do it
 - when I do it myself I either forget a step or go down a wrong pathway
- Queries aren't completely intuitive
- Freezes at times
- NOAAnrda.org – struggle to find things, I need to follow a link to get to certain places I can't navigate to – would like to have quick links on my desktop version of noaanrda, knew how to do it in classic and can't on modern and vice versa. Trustee vs trustee/rp access – I know where things are and how I should be able to get to them but I can't and its makes me crazy
- Difficult to use with Internet Explorer
- is more complex than how we previously screened data in QM.
 - You need a level of training to fully use DIVER appropriately.
 - There are tricks to query creation and flow of selection that can change

ERMA

- it makes sense when I watch someone else do it
- when I do it myself I either forget a step or go down a wrong pathway
- DWH has so much data it can be hard to navigate
- works well for certain basic tasks.
- Printing with proper placement and labels is tricky
- querying of layers could be more robust
 - however this may also be better accomplished in DIVER depending on user need.

Query Manager Desktop/On-Line

- requires you to look for things in a limited range of ways (e.g. only subsurface sediment chemistry; or must know study name)
 - doesn't always allow me to find what I'm looking for
 - even though it is there
- sometimes give me more than I'm looking for – bring into excel to compensate
- definitely someone needs to walk a new user through their first few experiences.
- QM-Direct, as the tool has not been updated for 10x, requires use of 3x, then operations in 10x for that functionality.
- desktop – if you shut down QM before Marplot – things get squirrely – long standing known issue
- there is currently not a way to select multiple user-selected bioassay endpoints,

ARD Tools Needing Attention

- the option is either one endpoint or all endpoints.
- To work around this requires exporting all the endpoints into ArcMap and then turning layers off and on and eventually deleting the ones not needed.
 - It is a very time consuming work around.
- For tissue data queries, I can select the exact species I want to look at and am not required to only select only one or all of them.

Photologger Online/Desktop

- Don't use photos and videos as much as could because overwhelming to dig in
- perhaps not caught up with tools but typically everyone with camera uploads into folder structure
- Need to be diligent about tagging them for them to be useful. Hardest part.
- Processing and making useful is difficult. Quickly can generate many photos.
- FinBase application – takes a LONG time because need to go through all photos.
- Challenge – easy to take photos but not processed with keywords or photos not useful.
- Finding useful photos out of many bad ones is difficult. Might tag whole roll.
- Issues with GPS and camera alignment and don't really use
- also need a tutorial (if we are still planning to use this software-- maybe it is obsolete now that cell phone pictures can automatically record locations?)
 - I have Photologger on my computer but I am not sure how to get updated versions
 - mine crashes because it is not the latest version
 - I don't know how to connect it to see other people's pictures besides my own
- Need more/tagging – easier searching
 - If I know what photo I want I have to dump through google chrome so I don't have to go pic by pic

HEA

- quirky and I have to go to the developers for that often

ORR.db

- “bad” data has to be modified to be included in the database
 - Incorrect data
 - Incorrect spatial information
 - Incorrect column names
 - Missing data
 - Missing columns

ARD Tools Needing Attention

Areas without tools, need tools for efficiency

- Stratus did a survey back when and I had definite input on this – contaminant and study list for example
- Restoration planning tools I would like to use that aren't covered
 - an empirical tool from an Army Corps paper for sizing channels for restoration
 - tools looking at watershed /landscape restoration
 - connectivity of habitats and their value and scaling
- Tools could probably be developed in ArcGIS that would make it easier for us to do certain analysis ourselves such as changing projections, nothing else comes to mind at the moment
- better understand ARD is one group we have such different clean-up concentrations across the country
 - help to explain different number form say same type of clean-up in Seattle vs Boston
 - bring us together rather than all being in different directions in our clean-up agreements with EPA –
 - different background concentrations - this should be part of the knowledge base tool
- some sort of project management tool relative to the process of what are we really trying to accomplish here
 - surprised to be jumping right into data management rather than a higher level on making sure
- Observational data
 - fits in category of labor intensive process.
 - Field teams recording observations (unstructured)
 - trying to QA and manage difficult.
- Early on with DWH
 - the more free-form data entry = more difficult.
 - Helping with multi-select; checkbox; circle helps with QA
- Sample IDs –
 - barcoding (random number)
 - aliases (alternate IDs)
- Laboratories
 - don't use same system to manage inventory and flow of sample processing.
 - Different commercial info management systems (LIMS).
 - Some use excel.

ARD Tools Needing Attention

- Lack of standardization is difficult.

- Sample tracking-
 - COC's aren't necessarily trackable electronically.
 - Lab would like to get electronic COCs first (save effort and transcription errors). Can't avoid all issues though...
 - If going to trouble on COC's- having way to track better would be good.
- Photo process – not systematic tagging of the photos – photo dump approach
- Journal articles – being able to stay up on the state of the science is important and very frustrating when I can't get something I'm interested in
- Sharing and editing of documents for lit sensitive and non-sensitive cases – sometimes a ftp site and other times gets emails –
 - just because you get notification of ftp site data doesn't mean people actually access it –
 - Google docs is OK for small docs, but nervous for lit sensitive data –
 - if you don't have a direct link you can very rarely find it despite all searching – not sure what - searching Gmail is the same
- Sharing information, data, etc is not as smooth as I would like it to be – really important for a division spread across the country, time zones, etc.
- converting shoreline segments to aerial extent based on a stratified random sampling design that then uses a shoreline and buffer to depict and calculated aerial extent categorically.