

*“Climate change is real.”*

~ Ron Allen, CEO/Chair  
Jamestown S’Klallam Tribe

Speaking at:  
Earth Day Celebration  
Port Angeles City Pier  
April 23, 2022


*Dungeness Watershed, Summer 2019 Drought*  
*Photo Credit: Washington Department of Ecology*





DUNGENESS WATER RESOURCES PLANNING  
RECOMMENDATIONS SUMMARY  
*Dungeness Water Resources Group (WRTG)*

DRMT Presentation  
July 13, 2022  
Tony Corrado, WRTG Chair



## WATER RESOURCES TECHNICAL GROUP (WRTG)

- Authorized by DRMT on 1/12/22
- 11 Active Members
- 6 Advisory Members

Chitwood, Scott	Former Jamestown S’Klallam Tribe NR Director Former DRMT Chair
Corrado, Tony	Protect the Peninsula’s Future Chair, Dungeness Water Resources Technical Group
Creasey, Carol	Clallam County Water Resources Program Manager/Hydrogeologist
Hals, Hansi	Jamestown S’Klallam Tribe Natural Resources Director, DRMT Chair
Hines, Shawn	Jamestown S’Klallam Tribe Watershed Planner
Holtrop, Joe	Clallam Conservation District Former Executive Director
Knapp, Robert	Jamestown S’Klallam Tribe Environmental Planning Manager
Martin, Tom	Clallam PUD #1 Water and Wastewater Systems Manager
Scagliotti, Alex	Graysmarsh Wildlife and Natural Resource Manager
Soule, Ann	City of Sequim Hydrogeologist, Resource Manager
Vail, Lance	Olympic Peninsula Audubon Society Hydrologist

## WRTG ADVISORY MEMBERS

Advisory Member	Affiliation
Gallagher, Mike, LHG	Washington Department of Ecology Water Resources Program Section Manager
Lea, Jolyne	Natural Resource Conservation Service Hydrologist
Miller, Ian, PhD	Washington Sea Grant/University of Washington Coastal Hazards Specialist
Murphy, Ryan	Point No Point Treaty Council Climate Change Action Analyst
Schwartzman, Peter	Mott Macdonald Principal Hydrogeologist
Smith, Ben	Sequim-Dungeness Water Users Association President

# SCOPE - Purpose

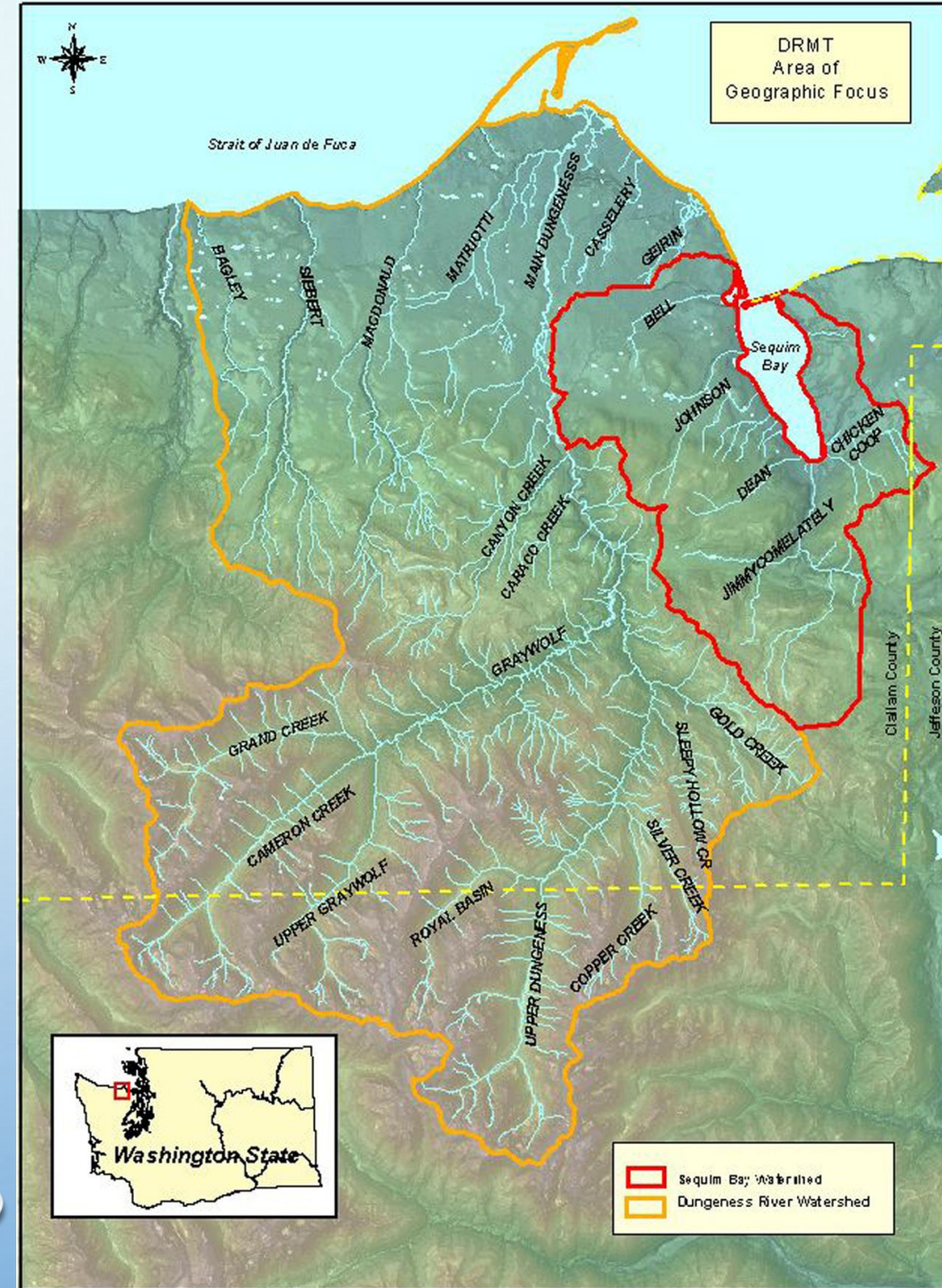
- Refined Mission Statement (2/11/22):

*To offer recommendations to the DRMT regarding specific studies of water supply and water demand/streamflow needs for the purpose of updating water resource management tools in the Dungeness watershed.*

- Key considerations, per DRMT Executive Committee:
  - What is the most essential data/information to obtain?
  - What are the most essential technical studies?
  - What are the most essential management tools (new or updated)?

## SCOPE - Spatial Domain

- DRMT Geographic Focus Area
- Dungeness Watershed and those waters influenced by it through the irrigation system, streams draining into Sequim Bay, and area aquifers.
- Impact on fish and wildlife dependent upon or affected by these area is also an essential concern for this group.



## SCOPE - Time Domain (5 years)

Climate change effects are occurring in real time, but need to consider:

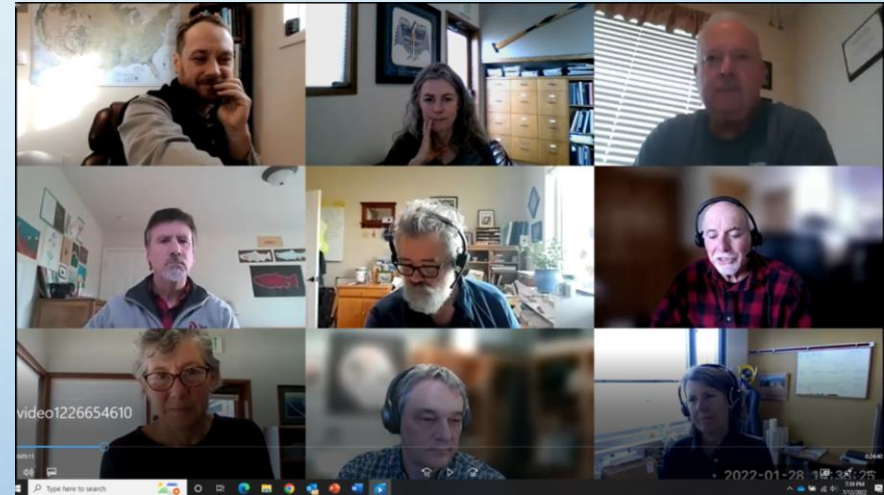
- Responsible agency determinations
- Planning, staffing & funding
- Contracting for implementation
- Data gathering, analyses, response



*Crews installing rock dams in the Dungeness River to help fish move upstream (2015 Drought).*

# WRTG PROCESSES

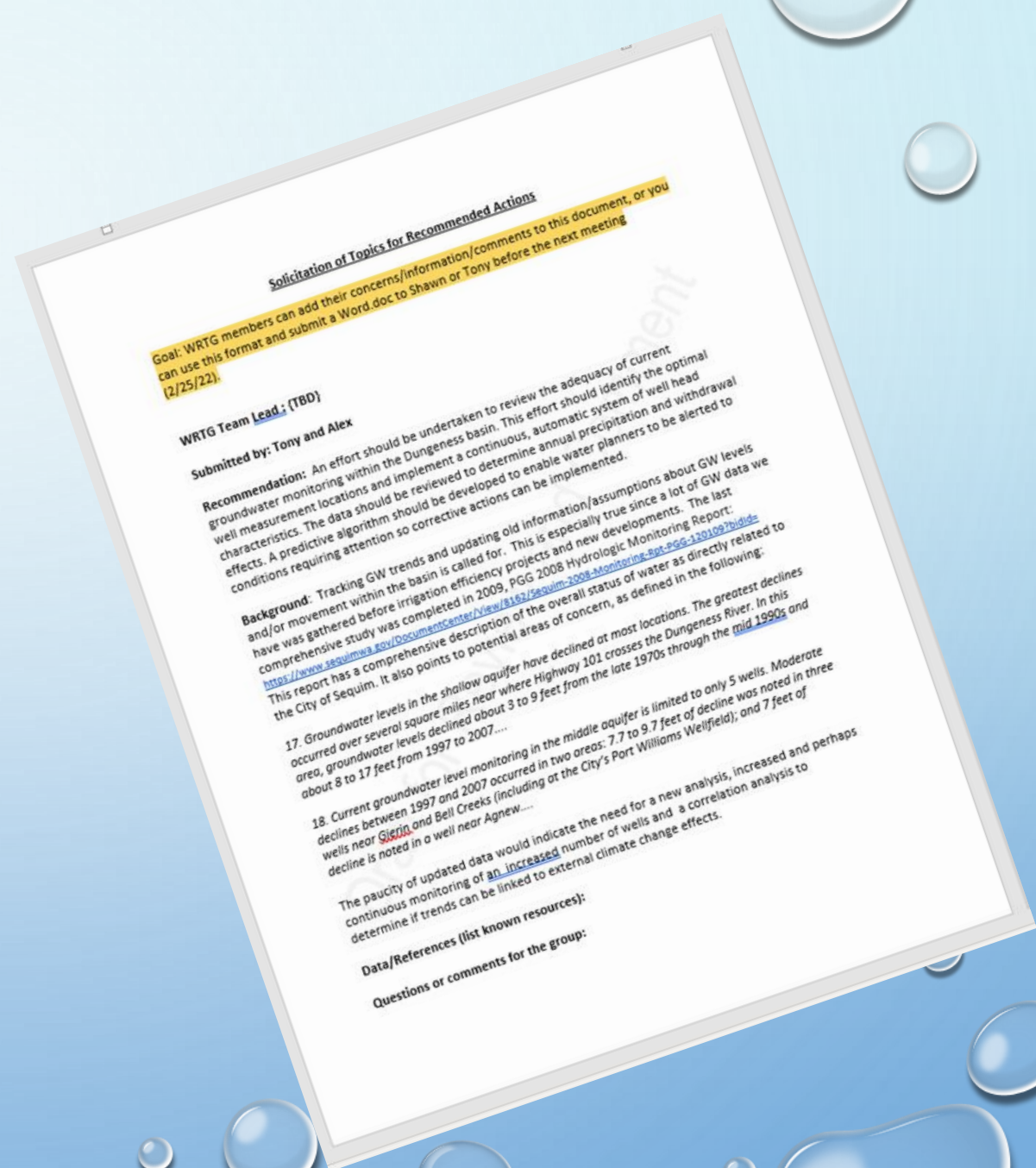
- Assigned roles, set meeting schedule, monthly updates to DRMT
- Refined scope (previous slides)
- Additional ground rules
  - Recommendations to be based on factual data or scientific analyses/studies
  - Agreed to not make policy recommendations (not in scope)
  - Sought consensus
  - In absence of consensus, majority vote prevailed





# WRTG PROCESSES

- Members submitted TOPIC proposals online (Google Drive)
  - Recommendations
  - Background
  - Data/References
- Members added Comments/Questions online
  - Resolved online or during meetings



# WRTG PROCESSES

- APPROVALS
  - Discussed during meetings and online
  - Voted online
  - Resulted in 13 Topics and associated Recommendations
  - Opinions that didn't elevate to a recommendation were included in "WRTG Comments" in Appendix

## 6.2 EXPANDED MONITORING PROGRAMS

*Volunteer Resource Team (volunteers needed):  
Streamkeepers (suggested)*

### Recommendations:

1. A listing of historic data sources and current monitoring programs related to water resources should be created and be available online for reference and easy access. Key gaps should be highlighted and addressed.
2. An effort should be undertaken to create an historical graphical profile based on detailed measurements that show the trend lines for all forms of precipitation, including snowpack, rainfall along with streamflow. This information should be updated continuously as data becomes available and be provided to decision makers and include potential, near-term, weather impacts based on the historical profiles.
3. A standard format, collection time-period and graphical interface should be established so this complete data set can be displayed as overlays of the selected display parameters.
4. Initiate an expanded groundwater monitoring program, according to results of groundwater status assessment and analyses (Recommendations in Section 6.1).

### Background:

While data related to precipitation has been generated for many years, continuous, integrated trends are not widely available. Most of this data is collected by different agencies and the lack of consistency in collection methods and reporting formats does not easily allow for overlay data comparisons. The data for our focus area are not available on a timely basis for managers to evaluate the criticality of specific conditions. The effects and timing of snowpack melt on groundwater and streamflow, as compounded by a change in seasonal weather patterns and average temperatures, are newly established.

### WRTG Member and/or Adviser Comments:

[Lance Vail] Installing a set of Hobo sensors in Dupontness from outlet to as far as I can drag myself up in basin to log stream temps. Will retrieve after a year recording at a fine time interval. mostly just interested in temporal variability patterns and to help calibrate model.

[Hansi Hals] There are 5 Hobo sensors deployed by JST (soon to be 6). Can share map and data. Some analysis done in R (7 Day roll of Daily Average and Daily Max) for years 2001-2015.

[Shawn Hines] From 4/22 WRTG meeting: incorporate Streamkeepers involvement?

[Carol Creasey, 5/20/22]

## TOPICS SORTED INTO 3 CATEGORIES

### Category A Information and Data Enhancement

- 6.1 Updated Groundwater Characterization
- 6.2 Expanded Monitoring Programs
- 6.3 Characterization of 4<sup>th</sup> Aquifer
- 6.4 Updated Water Demand Projections
- 6.10 Expanded Snowpack Study
- 6.11 Mitigating Potential Use of 4<sup>th</sup> Aquifer
- 6.12 Shallow Aquifer Recharge Effectiveness

## TOPICS SORTED INTO 3 CATEGORIES

### Category B Enhanced Models/Tools

- 6.3 Characterization of 4<sup>th</sup> Aquifer
- 6.7 Interactive Hydrologic Map
- 6.8 Comprehensive, Integrated Forecasting Model

## TOPICS SORTED INTO 3 CATEGORIES

### Category C General Interest

- 6.5 Climate Research on Impacts to Fish
- 6.6 Community Support through Public Outreach
- 6.9 Saltwater Intrusion Studies
- 6.13 Future Water Sourcing Studies

## 6.1 UPDATED GROUNDWATER CHARACTERIZATION

- Determine current status of ground water (monitoring)
- Update analyses on interrelationships of sources
- Analyze ground water quality

## 6.2 EXPANDED MONITORING PROGRAMS

- Create information base of all available; online accessible
- Create an historically based profile & maintain going forward
- Create graphical interface
- Include data from Topic 6.1

## 6.3 CHARACTERIZATION OF FOURTH AQUIFER

- Compile all existing data from wells
- Define geographical, quantity, geological character, sources
- Determine impacts on all aquifers as water is extracted
- Analyze permeability of confining layers
- Determine source age (renewability)



## 6.4 UPDATED WATER DEMAND PROJECTIONS

- Compile all usage data (domestic, agricultural, other)
- Compare to older projections (validity of methodology)
- Create updated estimates of future requirements
- Create aggregated record base

## 6.5 CLIMATE RESEARCH ON IMPACTS ON FISH

- Continue and expand PNTPC efforts on monitoring
- Add additional tasking to study birds, land animal impacts
- Add additional tasking to study temperature affects on streamflows and shallow waters

## 6.6 COMMUNITY OUTREACH

- Create a coordinated effort to implement community outreach
- Consider developing updated media availability
- Consider developing an outreach demonstration tool
- Enhance school curriculum to add cc and pace of human settlement

## 6.7 INTERACTIVE HYDROLOGIC MAP

- Develop an integrated tool for interactive display of groundwater (ArcGIS)
- Incorporate aquifer well monitoring data on same tool

## 6.8 COMPREHENSIVE INTEGRATED FORECASTING MODEL

- Conduct a feasibility study to determine if an integrated model can be developed to provide a continuous forecast of all parameters

## 6.9 SALTWATER INTRUSION

- Conduct a study to determine affects of sea water intrusion
- Consider well sampling for chloride, salinity & levels
- Assess vulnerable wells and septic systems

## 6.10 EXPANDED SNOWPACK STUDY

- Create an effort to quantify year-round snowfields
- Create a tool for relating snow melt over time to streamflow
- Relate future streamflow projections to aquifer recharge
- Create real-time tool to provide data for resource managers

## 6.11 MITIGATING POTENTIAL USE OF 4<sup>TH</sup> AQUIFER

- Consider a new analysis to upgrade the current “mitigation calculator”
- Review and consider the new PUD/cc proposed methodology
- Update the current 4<sup>th</sup> aquifer model (“uncertainty analysis”)



## 6.12 SHALLOW AQUIFER RECHARGE EFFECTIVENESS

- The shallow aquifer recharge facilities should be analyzed to determine their effectiveness and compare projections to actual values

## 6.13 FUTURE WATER SOURCING STUDIES

- Conduct a study to consider future sources that can supplement existing sources

# APPENDIX = TOPIC DETAILS

## Subsections for each Topic:

- **Resource Team** – listed to seek volunteers for collaborating on advancing recommendations
- **Recommendation(s)** – listed as in the Summary document
- **Background** – presents rationale for each Topic
- **Comments** – allowed individual WRTG and Advisory member concepts and concerns to be included
- **References** – list works cited, as well as sources of further information, data, studies

# NEXT STEPS?

- DRMT endorsement of Summary and Appendix
- Guidance from DRMT Executive Committee on distribution
- Resource Teams
- Implementation

