Hutchinson Environmental Sciences Ltd.

“One Voice” to Monitor Northern Canada’s Freshwater Aquatic Environment

Method Development to use Inuit Qaujimajatuqangit and Western Science in Conjunction

April 5, 2017
Angijunut Piliaksanut Maligait ("Rules About Big Projects" aka “the Regulatory Session”)

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POLAR Knowledge Canada

Nunavut General Monitoring Plan
Nunavunmi Tamainni Takuurivangnikkut Parnaiyautaanni
Plan de surveillance générale du Nunavut

KIA

Outline

- Inuu'tuti: Baker Lake Cumulative Effects Monitoring Program
- Traditional Knowledge as it is used today
- One Voice Methodology
  - The "Curious Scientist"
- Findings
- Next Steps

Inuu'tuti: Baker Lake Aquatic Cumulative Effects Monitoring Program

- Initiated in September 2014 in Baker Lake
- Directed by a Secretariat of Key Stakeholders:

Indigenous and Northern Affairs Canada | Affaires autochtones et du Nord Canada

Nunavut General Monitoring Plan
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Nunavut Water Board

- Funded by:

POLAR Knowledge Canada

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Overall Goal: Establish a strong aquatic cumulative effects monitoring program for the Kivalliq region that includes Traditional Knowledge and Western Science approaches – "One Voice"

Inuu'tuti: Baker Lake Aquatic Cumulative Effects Monitoring Program

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Science Questions

- Are current conditions acceptable?
  - *If not what are the causes?*
- Is the Baker Lake watershed changing?
  - *If so, what are the causes?*

Community Questions

- Is the water safe to drink?
- Are the fish good to eat?

IQ and Decision Making

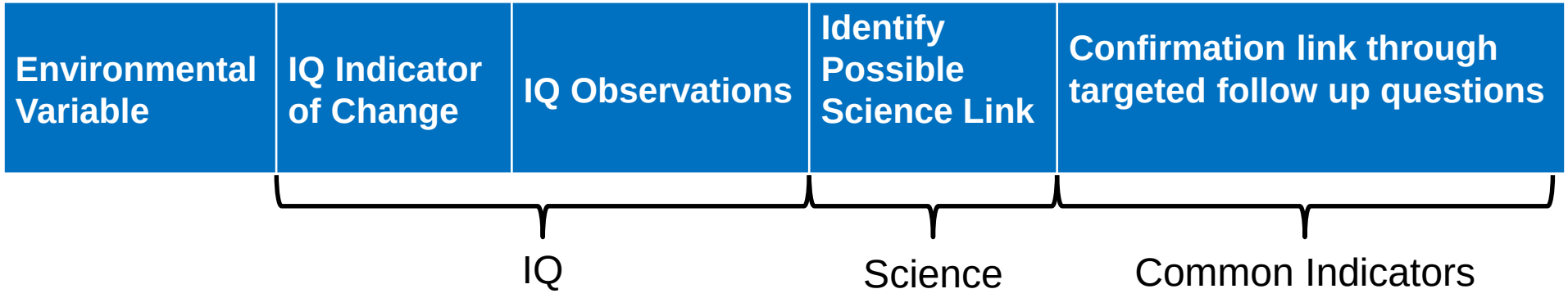
- Nunavut Impact Review Board:
  - *"increasing expectation that government regulatory agencies integrate local or traditional knowledge with "scientific" knowledge"*
- Nunavut Water Board:
  - *"Inuit Qaujimajatuqangit (IQ) is the most successful and oldest monitoring practice in Nunavut, where the resource users do the observing or monitoring. Information collected through IQ can contribute to mine design and planning, as well as monitoring activities."*
- Has this been successful?

Environmental Impact Statements

- Existing Environment and Baseline Information
  - *“The rivers have less water. In winter there’s hardly any water in them. You can see rocks.”*
- Mitigation and Adaptive Management
  - *“Natural variability has been documented as part of the baseline studies and the TK report; this variability will be incorporated into future monitoring programs.”*
- Past efforts have
  - Used IQ ineffectively, predominantly stopping at VEC identification
  - Used IQ and western science separately

“One Voice” Project

- Aims to bring together Inuit Qaujimajatuqangit and western science into “One Voice” to monitor cumulative effects
  - Both approaches can learn from each other to develop a strong and unified approach or “voice”
- Interviews are semi-directed with targeted follow-up
  - Includes detailed follow up questions by a “curious scientist”
  - Major difference between these interviews and those that have been conducted in the past by IQ specialists alone



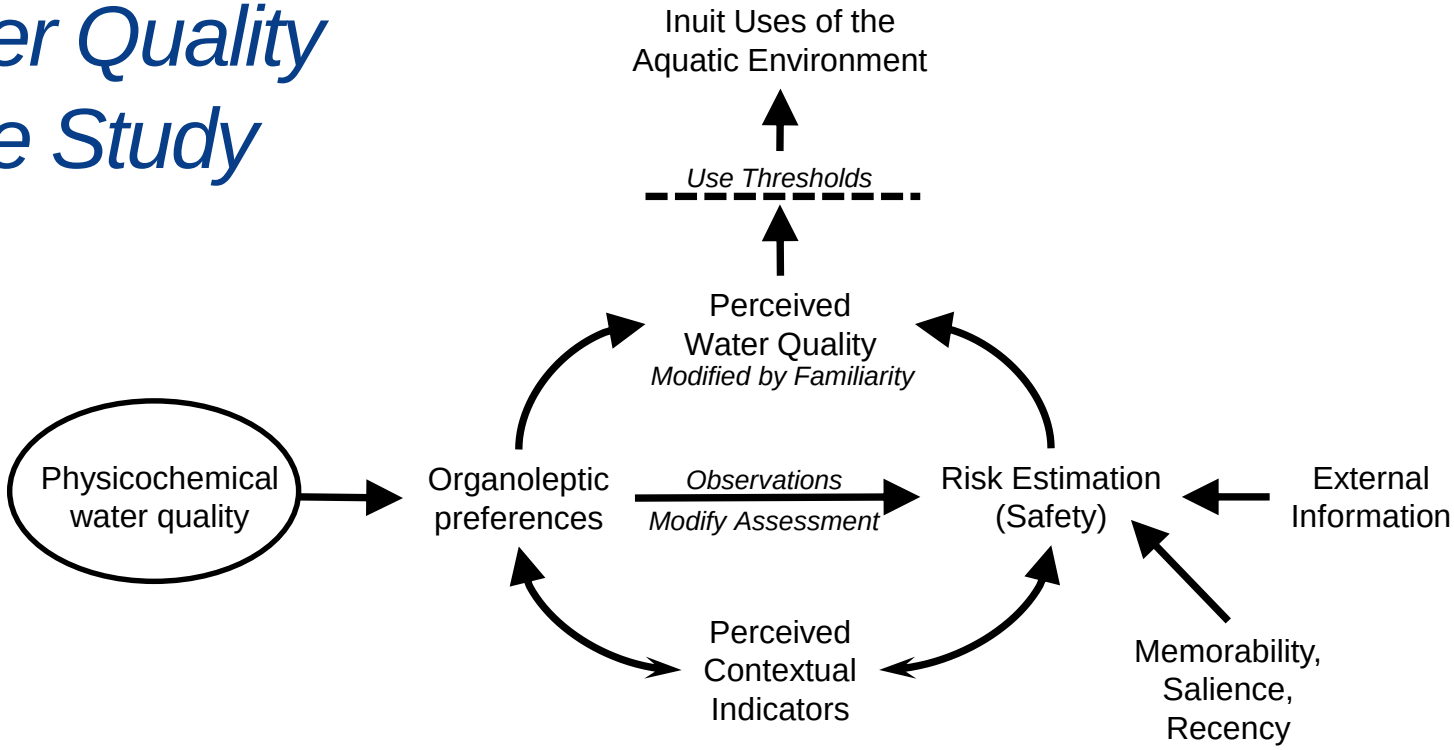
Key VECs and Uses

VEC	Water Quantity	Water Quality	Fish
Inuit Use	• Transportation by boat • Access to traditional routes	• Hot beverages (tea, coffee) • Drinking water • Cooking water • Washing	• Harvesting fish • Consuming fish
Conceptual Threshold	Changing methods of transportation and altered route access	No longer acceptable for consumption or washing	Significant decline in catch per unit effort. Undesirable size, condition, fat content or appearance.

- Each use is assessed through IQ indicators
- These can be linked to western science indicators and complimented by western science evaluations

Evaluations

Water Quality Case Study

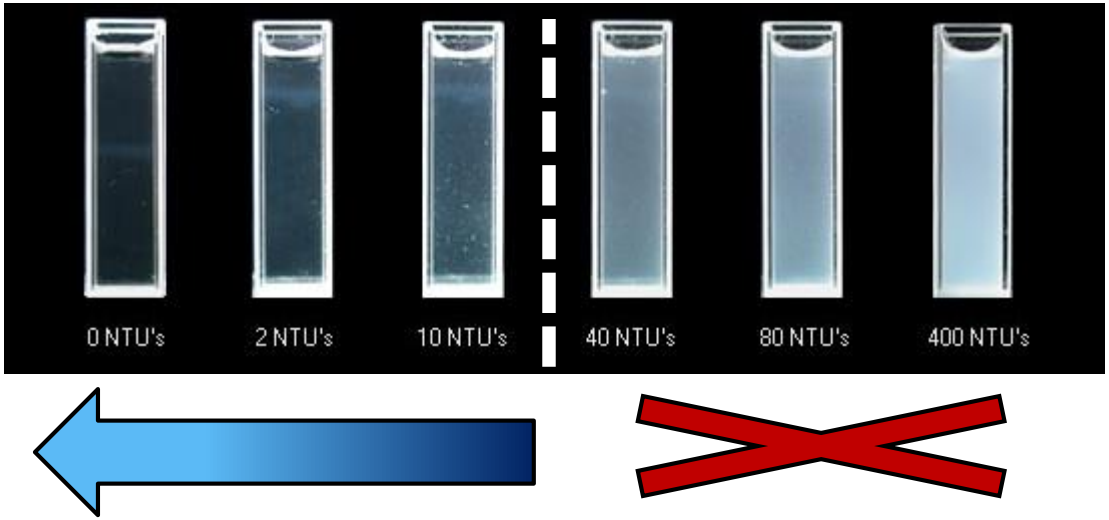


- Measurement indicators which can be measured through both IQ and western science are the **Common Indicators**

Indicator Types	IQ Measurement Indicators	Western Science Measurement Indicators
Taste & smell (Organoleptics)	Taste of “land”	Dissolved organic carbon
		Total organic carbon
		Organic matter
		pH
		Conductivity
		Nutrient concentrations: nitrogen species, phosphorus
		Chlorophyll a
	Saltiness	Conductivity
		Salinity
		Chloride, sodium
		Hardness
		Alkalinity
	Fishy smell	Specific algal community
		Nutrient concentrations: nitrogen species, phosphorus
		Chlorophyll a
	Water is "refreshing"	Salinity
		pH
		Temperature
		Total suspended solids
		Total dissolved solids
		Turbidity
		Chloride, sodium
		Copper, iron, manganese, sodium
		Flow
		Hardness
		Oil and grease

Common Indicators

- Preferences are often based on a **continuum**

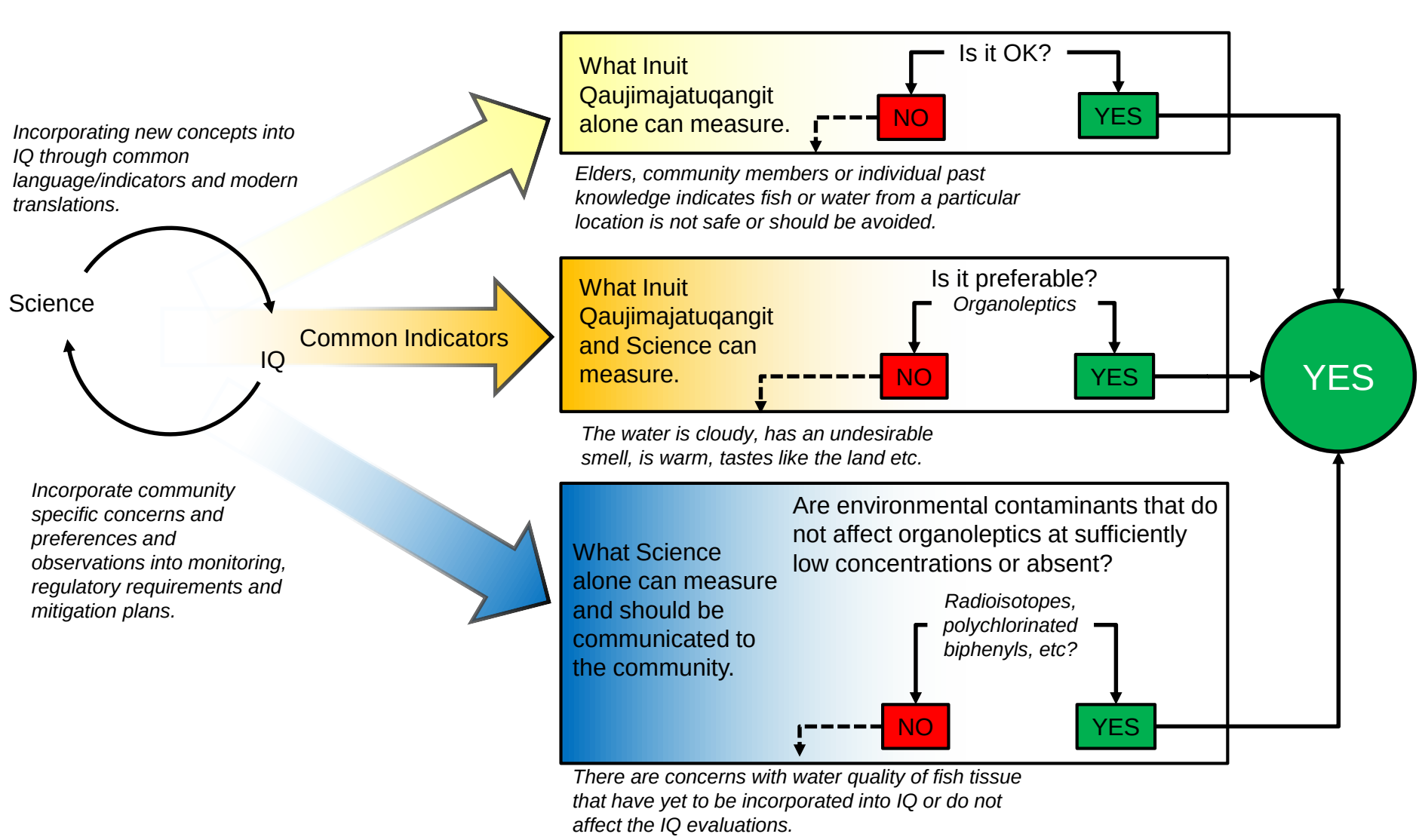


- Thresholds in the regulatory context can be set using IQ and scientific criteria
- Key is identifying where the threshold lies on the continuum

- Descriptions of organoleptics appear fairly consistent across the north
  - Similar descriptors were used in other studies
- Relative importance for each organoleptic can vary widely between cultures and communities
  - Influenced by habituation – preferences for what they are used to
  - Requires location and project specific IQ

Image Credit:
camblab.info/wp/index.php/what-is-turbidity/

Applications



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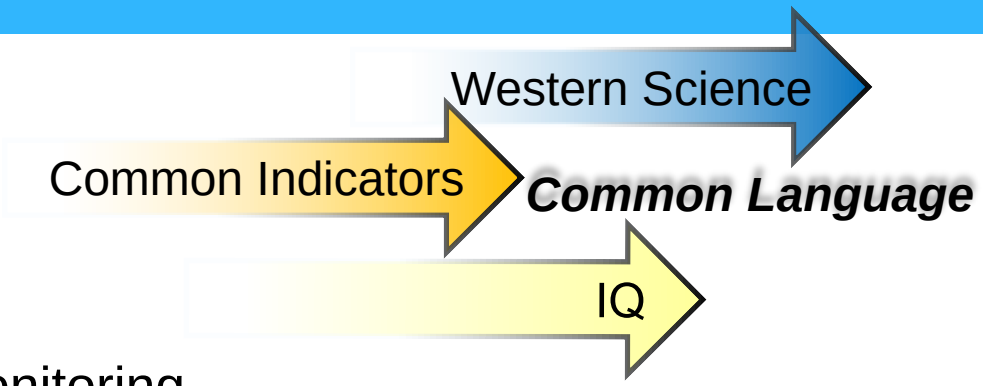

- Community Based Monitoring
  - Incorporate community observations into monitoring plans of the aquatic environment
- Education and New Translations
  - Develop translations for modern concepts
  - Facilitate improved understanding of interactions between potential project activities and the environment
- Improved Consultations
  - Regulatory: specifically address parameters influencing local organoleptic preferences and risk evaluation
    - Discharge criteria
    - Monitoring parameter suites
    - Require mitigation measures
  - Land Use Planning: Full impact of management decisions
    - What aspects the aquatic environment can be permitted to change?
    - Can we have a land use that doesn't impair the aquatic environment?

Next Steps

- Confirm common indicators and scale during the 2017 or 2018 as part of Inuu'tuti
- Determine thresholds of Inuit use for common indicators
- Work to establish community based monitoring protocols

- Our hope is the methods will be incorporated by regulators into the monitoring framework
  - A new line of evidence for tracking project specific and cumulative effects

Baker Lake, Nunavut. July 2015

QUESTIONS

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