MAKING THE MOST OF MENTAL MODELS

Kelsey LaMere, Samu Mäntyniemi, Jarno Vanhatalo, & Päivi Haapasaari

ROAD MAP

1. Context
2. What Participatory Modelling & Mental Models Are
3. Why We Use Them
4. Need for a New Methodology
5. The Rich Elicitation Approach
6. Benefits & Challenges

DANIEL GONZALEZ

CONTEXT

Atlantic salmon - *Salmo salar*

CLIMATE CHANGE & THE BALTIC

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SALMON NEED COLD WATER

PROBLEM FRAMING

WHAT IS GOING ON HERE?

WHAT DO WE WANT?

HOW DO WE GET WHERE WE WANT TO BE?

PINE WATT

Any person who is invested in the resource based on profession, leisure, or interest.

ANASTASIA FOMINA

PARTICIPATORY MODELLING

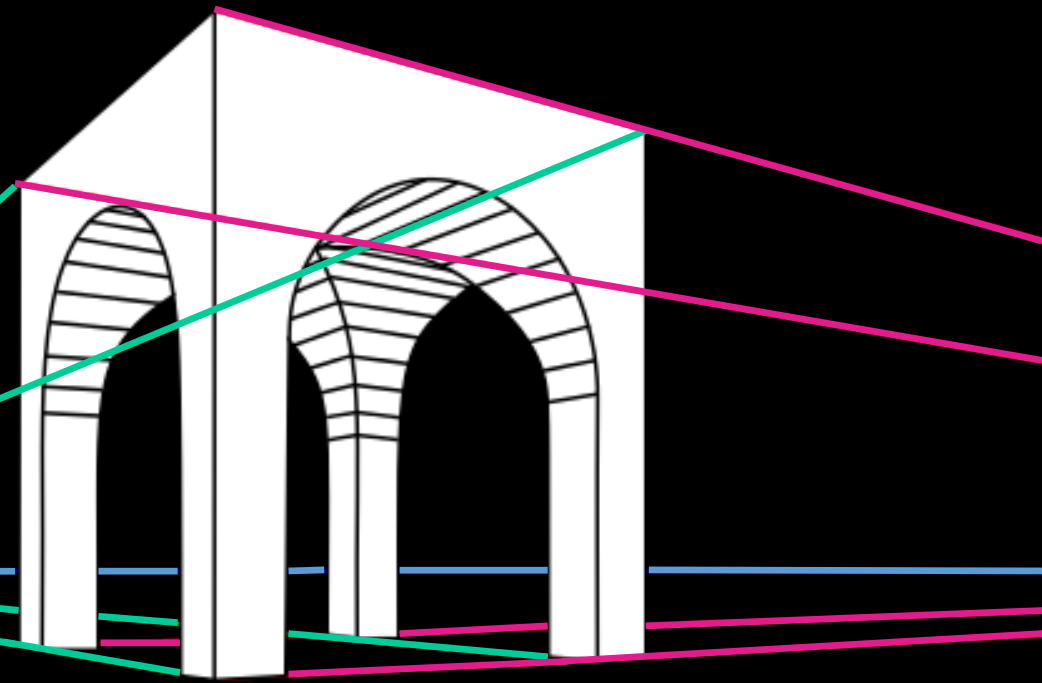
WHEN THE WIDER COMMUNITY CONTRIUTES

SUBSTANTIVE – Knowledge synthesis & problem solving

NORMATIVE - Legitimacy

INSTURMENTAL – Relationship building & implementation

EDUCATIONAL – Learning & growth



WHAT ARE MENTAL MODELS?

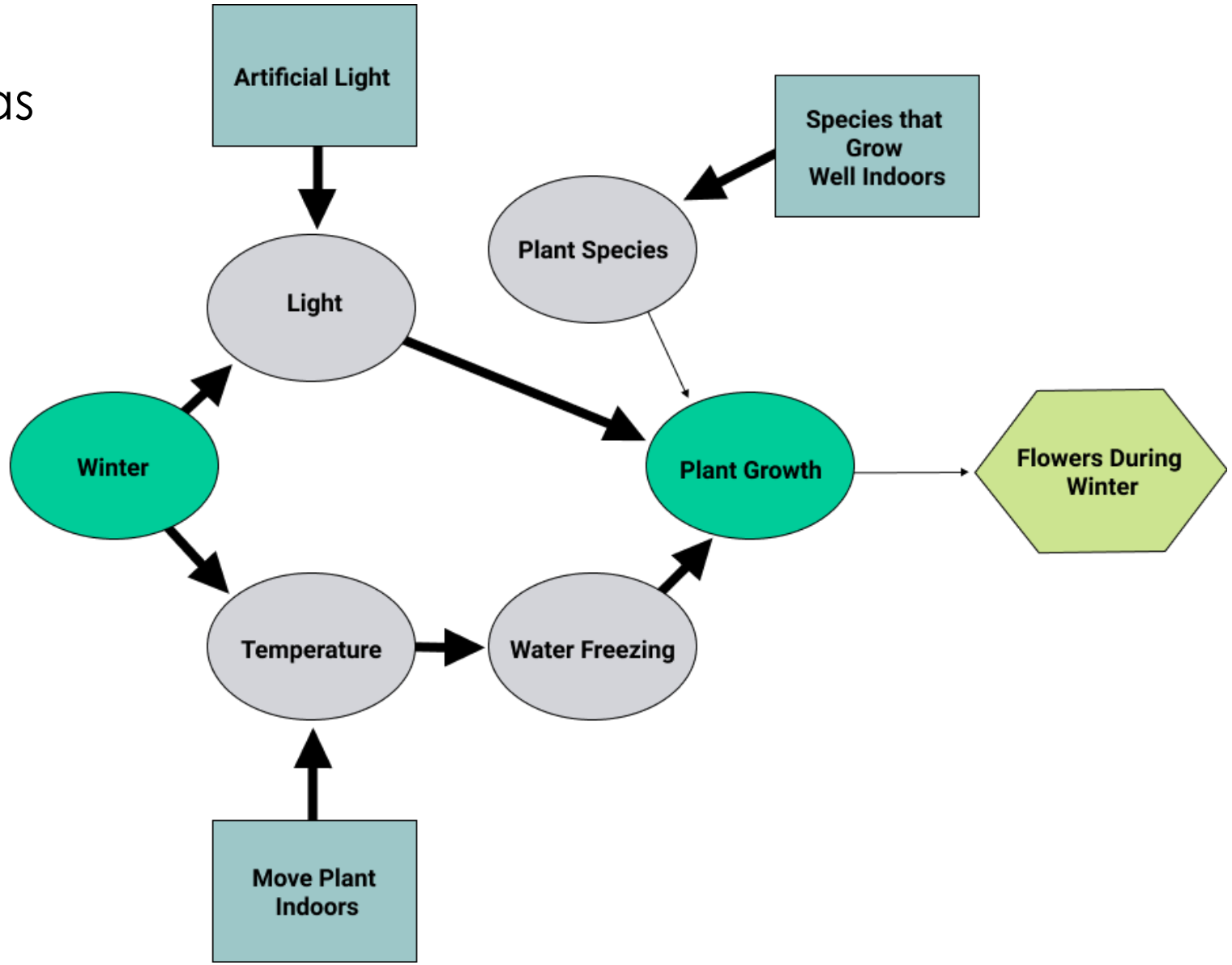
- Structural & Exploratory Tool for participatory modelling
- Conceptualization of a system's causal dynamics
- Built on personal experience, knowledge, and values
- Cognitive aid in reasoning

WHY MENTAL MODELS?

IMPORTANCE

- Knowledgebase
- Alternative hypotheses
- Brain storming
- Holism
- Values

Mental Models as Influence Diagrams



DIRECT ELICITATION

INDIRECT ELICITATION

DIRECT ELICITATION

Can Lead to:

Over Simplification

Can Lead to:

Inaccurate Representations of Stakeholder Beliefs

INDIRECT ELICITATION

PROBLEM #1: RICHNESS

NAOMI TAMAR

PROBLEM #2: WE NEED BETTER PM DOCUMENTATION

Although participation is becoming ubiquitous in environmental modelling, participatory methods are not well documented and lessons learned are rarely published.

KELLY SIKKEMA

DIRECT ELICITATION

THE RICH ELICITATION APPROACH

INDIRECT ELICITATION

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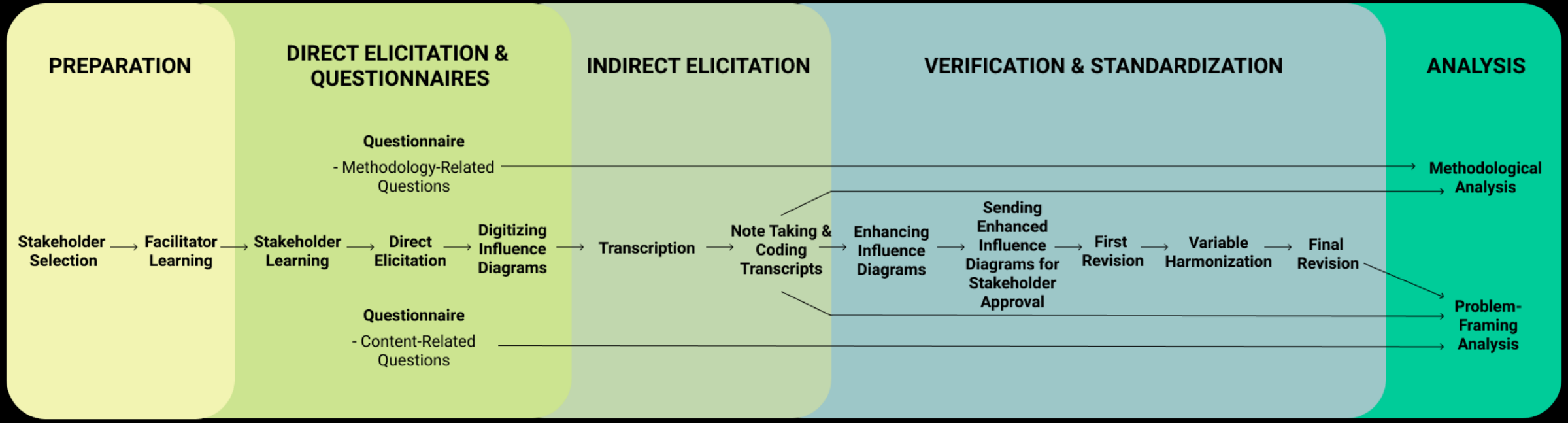
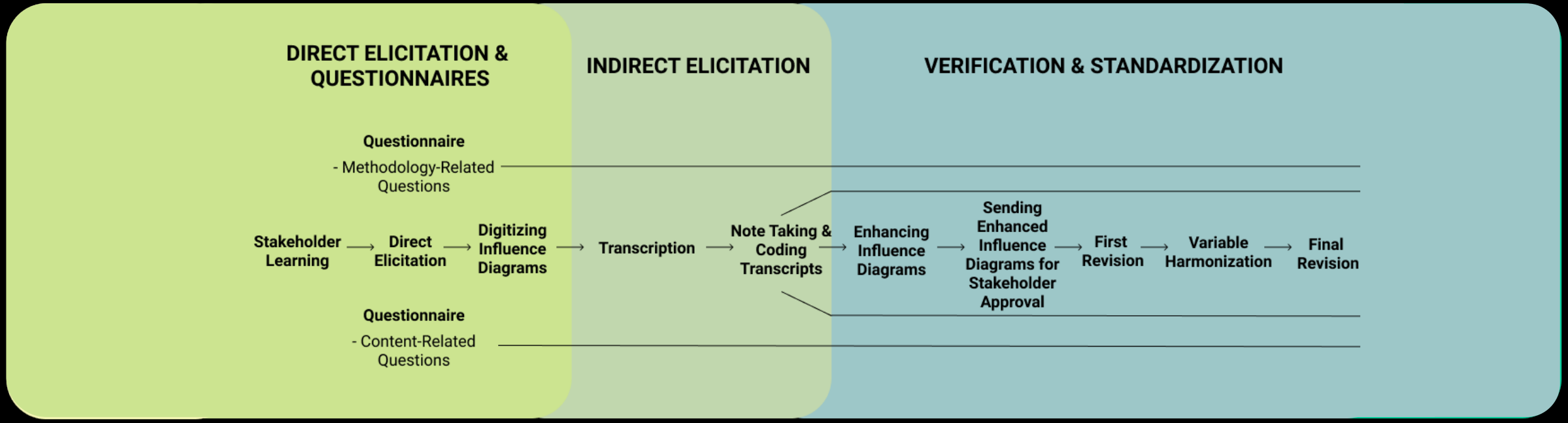
THE RICH ELICITATION APPROACH



THE RICH ELICITATION APPROACH



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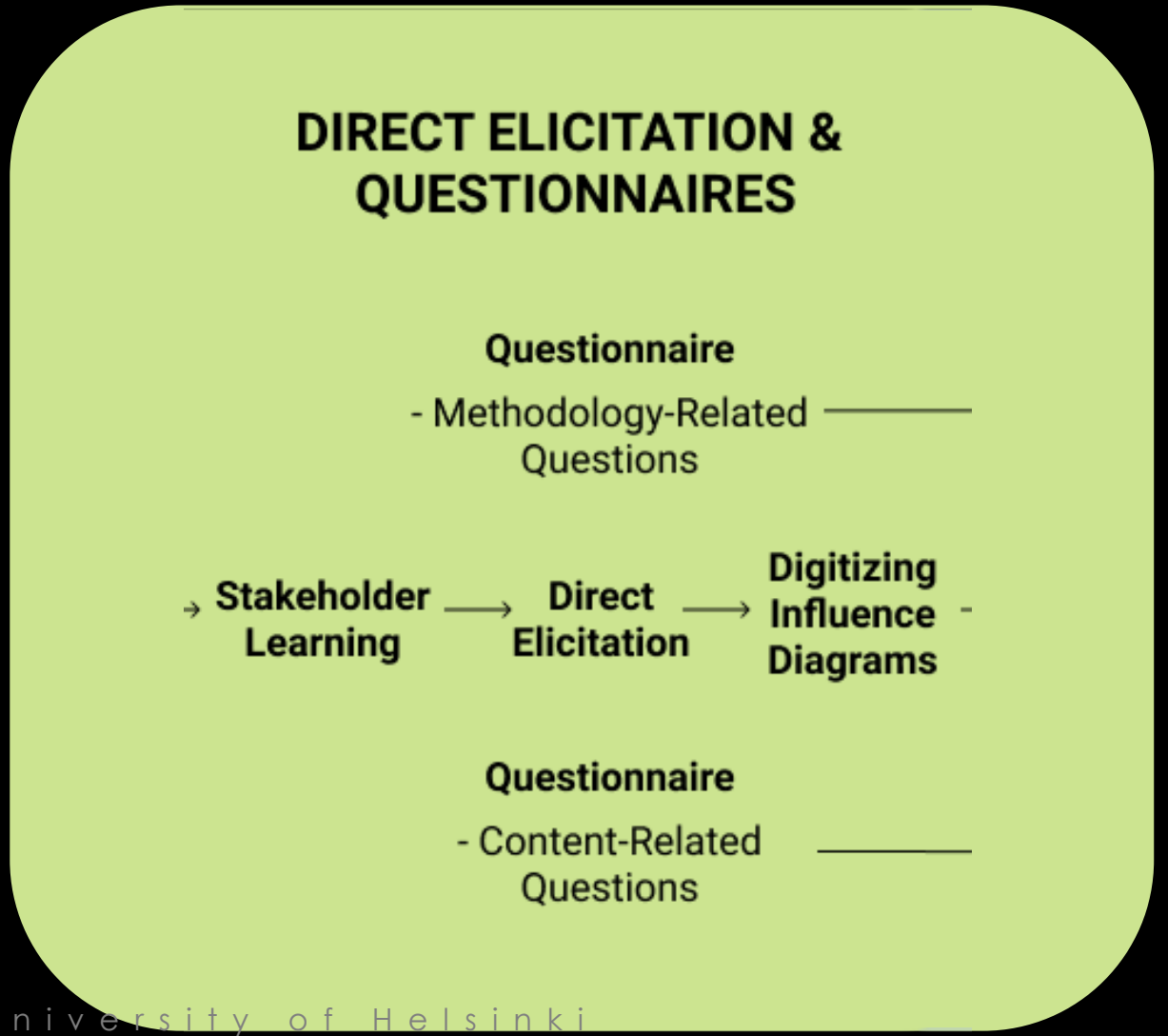
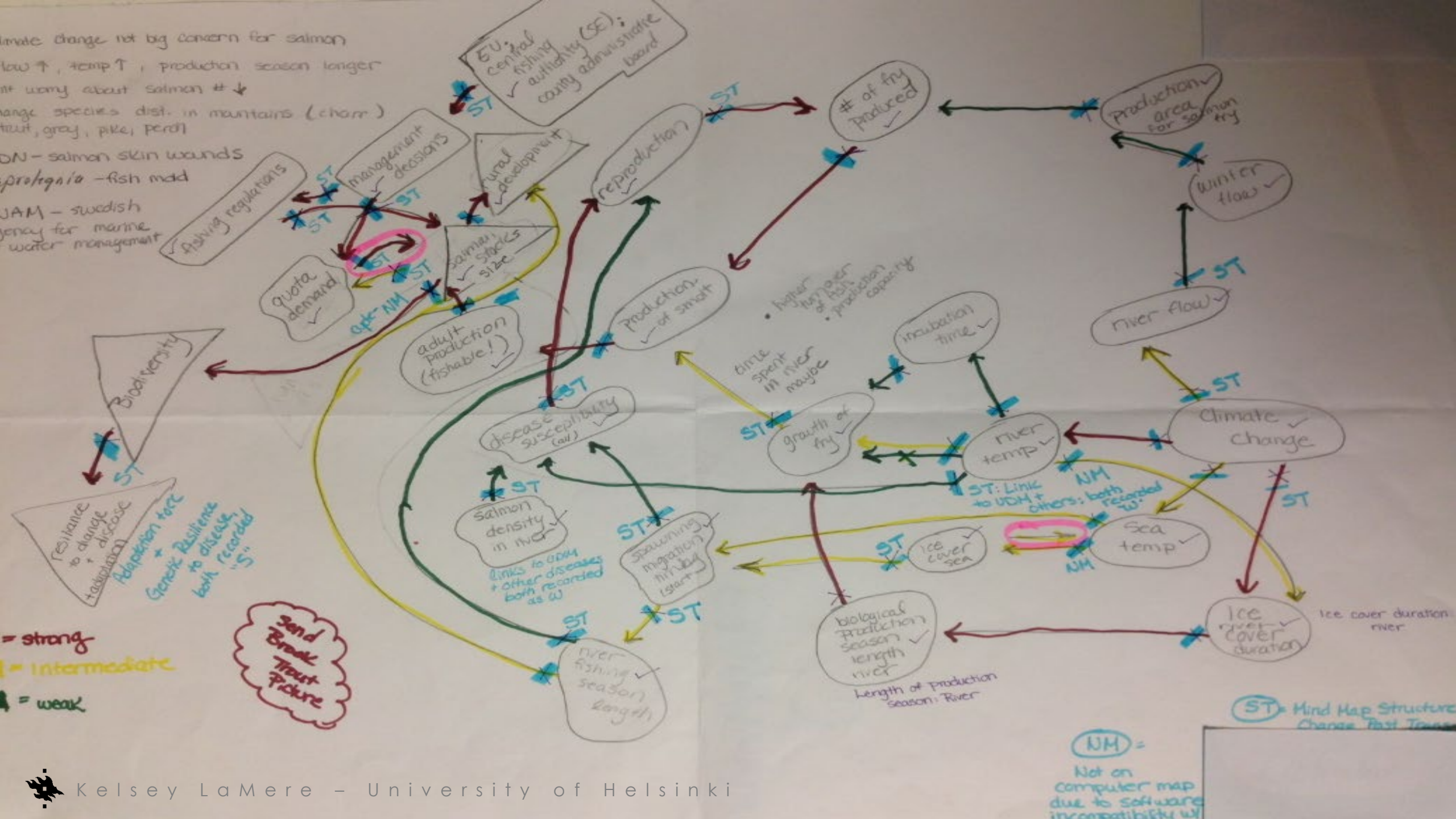
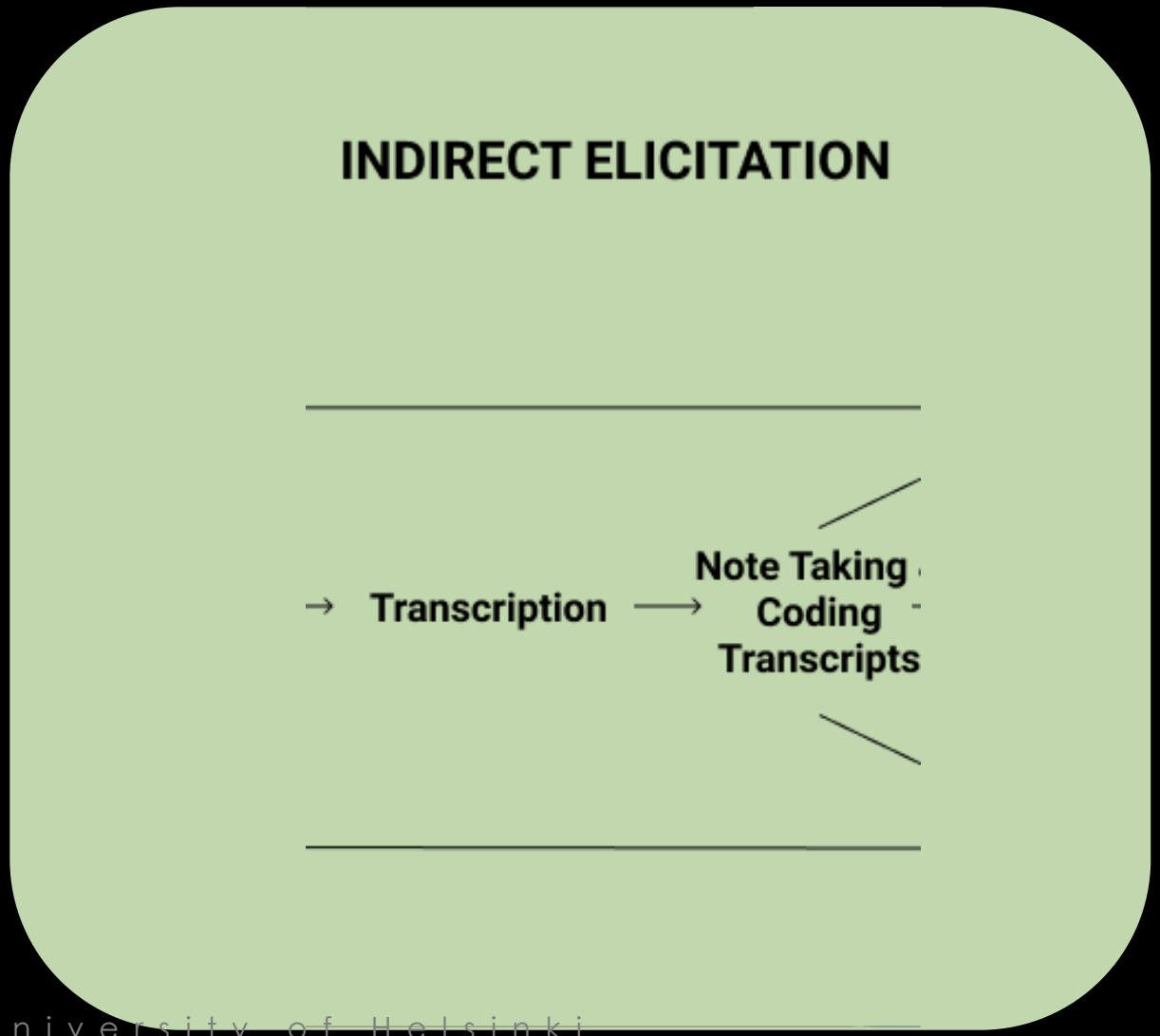



climate change not big concern for salmon
flow ↑, temp ↑, production season longer
not worry about salmon # ↓
change species dist. in mountains (charr)
trout, grey, pike, perch
DN – salmon skin wounds
prohgnio – fish mold
JAM – swedish
agency for marine
water management
EU: Central fishing authority (SE); county administrative board
ST
# of fry produced
Production area for salmon fry
reproduction
rural development
management decisions
fishing regulations
quota demand
salmon stocks size
opt: NM
adult production (fishable!)
Production of smolt
winter flow
river flow
incubation time
time spent in river maybe
growth of fry
river temp
climate change
disease susceptibility (all)
salmon density in river
Links to UDH + other diseases both recorded as U
spawning migration timing (start)
ice cover sea
sea temp
ST: Link to UDH + others; both recorded U
NM
biological production season length river
ice cover river duration
ice cover duration river
Length of production season: River
river fishing season length
Biodiversity
resilience to change + disease + adaptation
Adaptation here + Genetic Resilience to disease, both recorded "S"
= strong
= intermediate
= weak
Send Break Trout Picture
ST = Mind Map Structure
NM = Not on computer map due to software
Kelsey LaMere – University of Helsinki

THE RICH ELICITATION APPROACH



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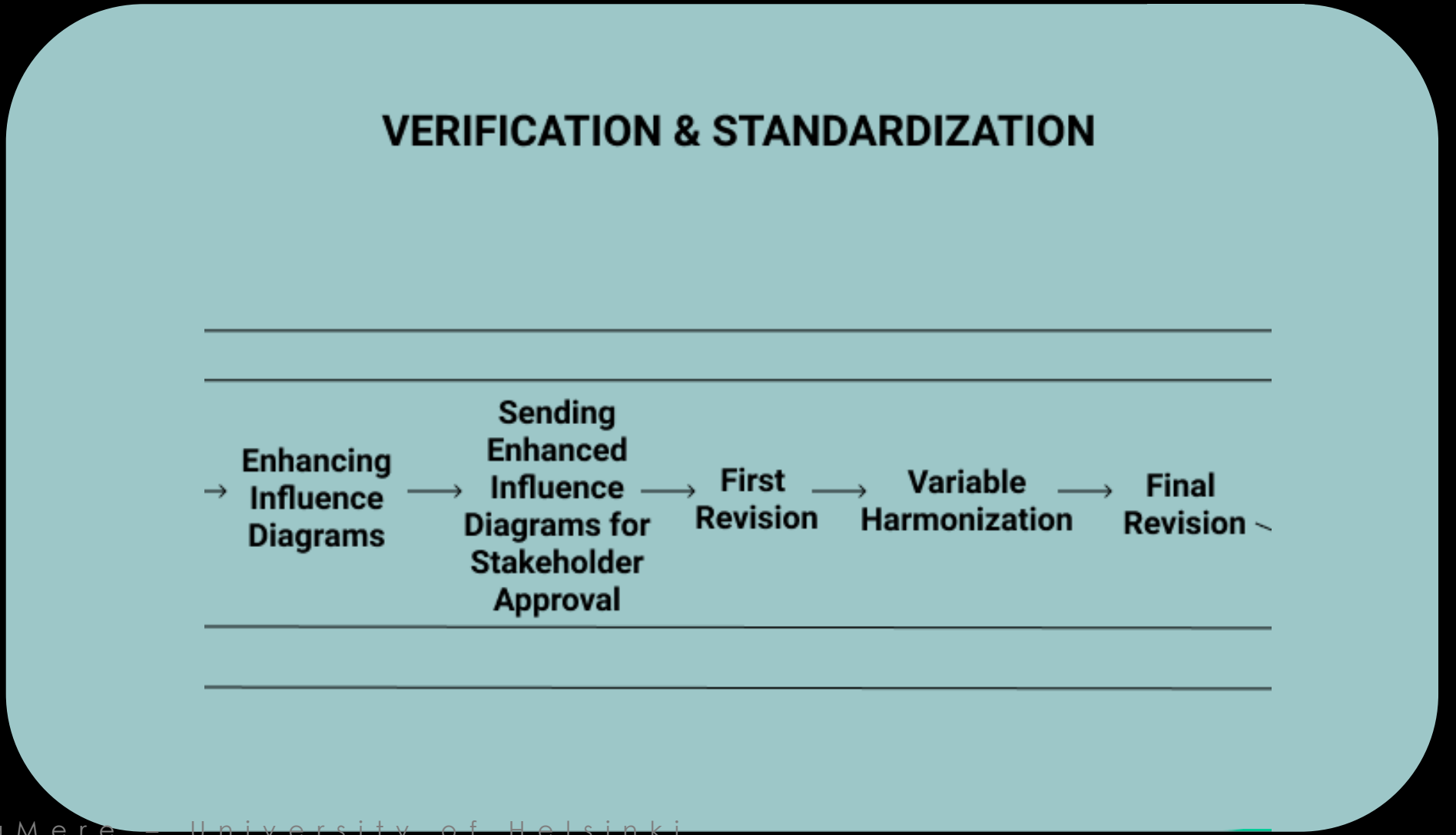
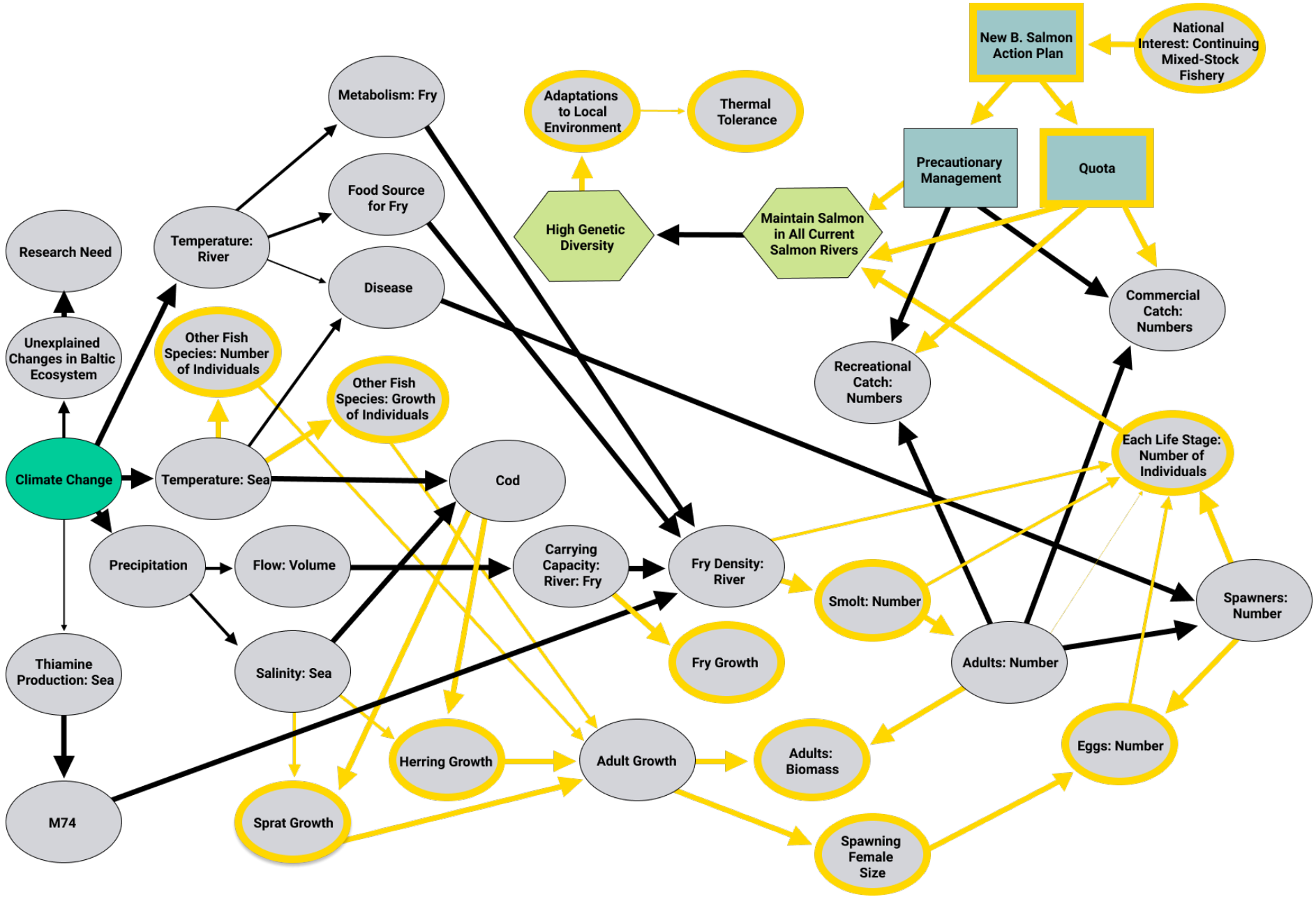



New B. Salmon Action Plan
National Interest: Continuing Mixed-Stock Fishery
Metabolism: Fry
Adaptations to Local Environment
Thermal Tolerance
Precautionary Management
Quota
Food Source for Fry
High Genetic Diversity
Maintain Salmon in All Current Salmon Rivers
Research Need
Temperature: River
Disease
Commercial Catch: Numbers
Unexplained Changes in Baltic Ecosystem
Other Fish Species: Number of Individuals
Recreational Catch: Numbers
Other Fish Species: Growth of Individuals
Each Life Stage: Number of Individuals
Climate Change
Temperature: Sea
Cod
Precipitation
Flow: Volume
Carrying Capacity: River: Fry
Fry Density: River
Smolt: Number
Spawners: Number
Thiamine Production: Sea
Salinity: Sea
Fry Growth
Adults: Number
Herring Growth
Adult Growth
Adults: Biomass
Eggs: Number
M74
Sprat Growth
Spawning Female Size

OBSERVATIONS OF STAKEHOLDERS

Generally positive attitude

Quickly understood direct elicitation

Preferred facilitator to draw

Uncertainty about own knowledge

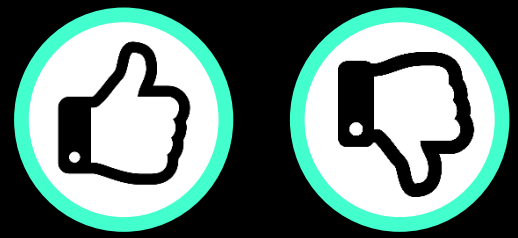
Frustration with messiness

STAKEHOLDER OPINIONS

Substantive *(Knowledge)*

Normative *(Legitimacy)*

Instrumental *(Relationships)*

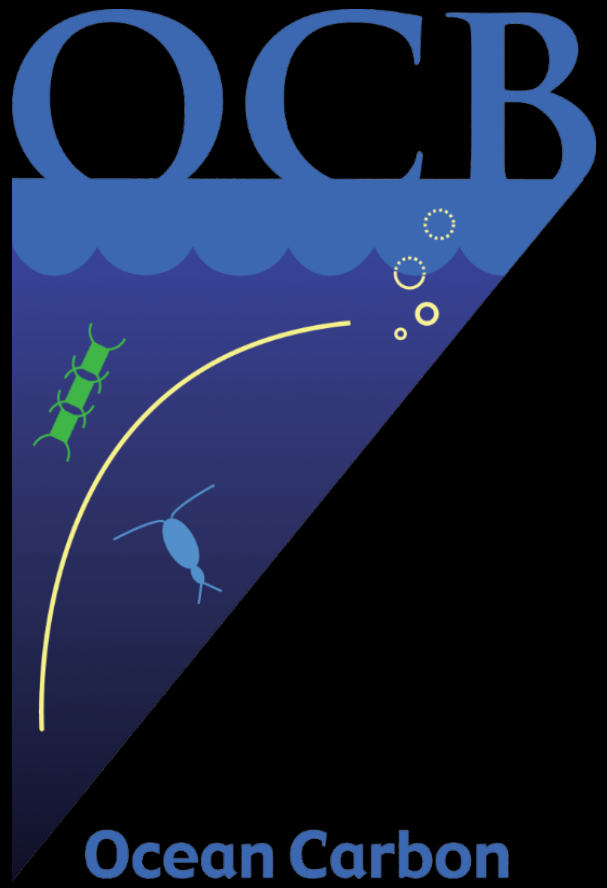


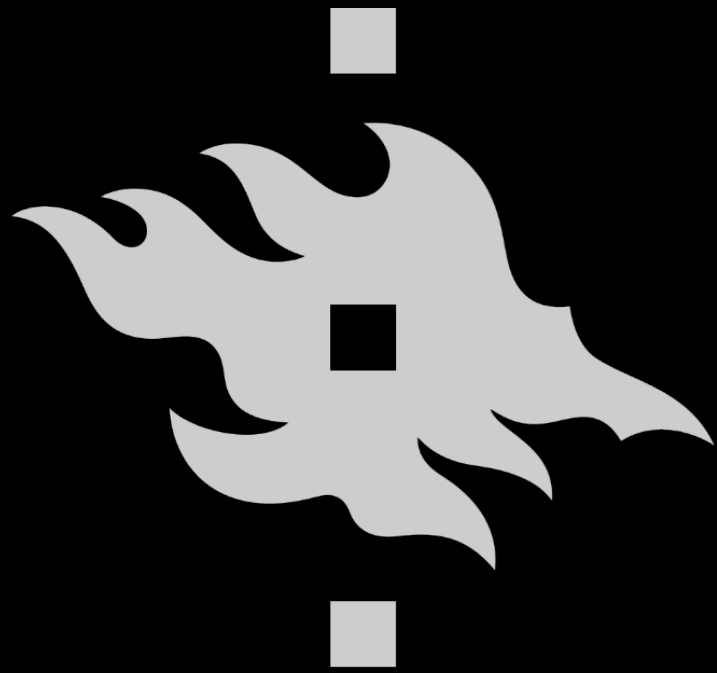
Educational *(Learning)*

CHALLENGES & FUTURE IMPROVEMENTS

- Fix follow-up Failure
- Explain expectations & Context

THANK YOU





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