CONNECTED BY NATURE

LINKING THE PUBLIC TO SCIENCE

EMERSON H. SMITH

CONNECTED BY NATURE

LINKING THE PUBLIC TO SCIENCE

EMERSON H. SMITH

AS HUMAN DEVELOPMENT INCREASINGLY PUTS PRESSURE ON THE NATURAL ENVIRONMENT, RESEARCH INTO HOW TO MITIGATE DAMAGE WILL BE MORE VITAL THAN EVER.

Despite this, society choses to ignore the advice of experts and disregard the remedies that are proposed.

Society will need to live with the results of our action or inaction as we continue to forge into an increasingly human dominated world.

Many people draw their identity with a location. Keeping this land healthy and productive requires thoughtful approach involving everyone.

THE STATUS OF SCIENCE

HIGH LEVELS OF DISTRUST OF SCIENTISTS WITHIN SOCIETY

FUNDING CUTS ARE PROPOSED TO MAJOR RESEARCH INITIATIVES

DISREGARD FOR ECOLOGICAL RESEARCH HAS BECOME THE NORM, NOT THE EXCEPTION

REGIONAL ISSUES

NW ONTARIO AND NE MINNESOTA

BIRCH DIE OFF

WOLF POPULATION

LAKE TEMPERATURES

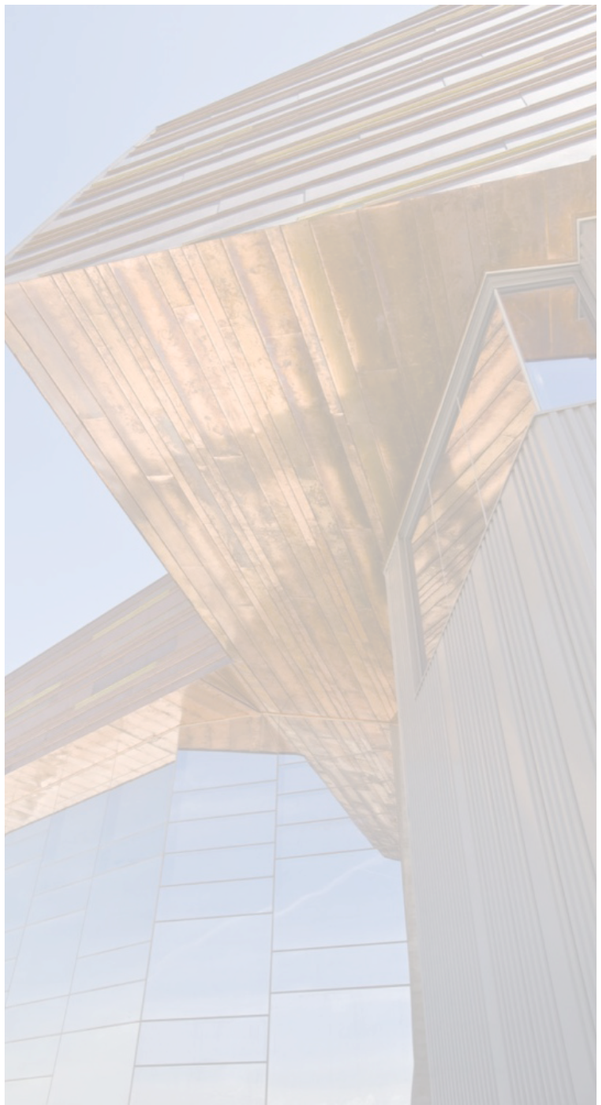
MINING

HOW CAN ARCHITECTURE FOSTER A STRONGER CONNECTION BETWEEN ECOLOGICAL CONSERVATION RESEARCH AND THE PUBLIC?

SYSTEM OF INQUIRY	STRATEGIES	TACTICS	PHILOSOPHY/THEORY
Emancipatory There are multiple realities, but they are overlapping. Developed through hist/ social/cultural and empowerment identity. This project is an attempt to let people apply science to their reality. Allowing multiple views leads to increased connection and trust.	Qualitative Learning the needs of the clients and visitors leads to a space that satisfies the needs of all involved. Logical Argument Multiple iterations can lead to new forms that fit the site and program better. Holistic Case Studies Review multiple examples of existing structures can show what works and what doesn't based on functioning buildings.	Literature Review Contemporary or recognized books, articles, etc. Personal Interviews Groups or individuals, experts, subjects, occupants. Iterative Design Learning from past attempts to find the best solution	Eco-Social (Sustainable Design) Respecting the site shows commitment to the ecological conservation that is being displayed and researched within the facility.

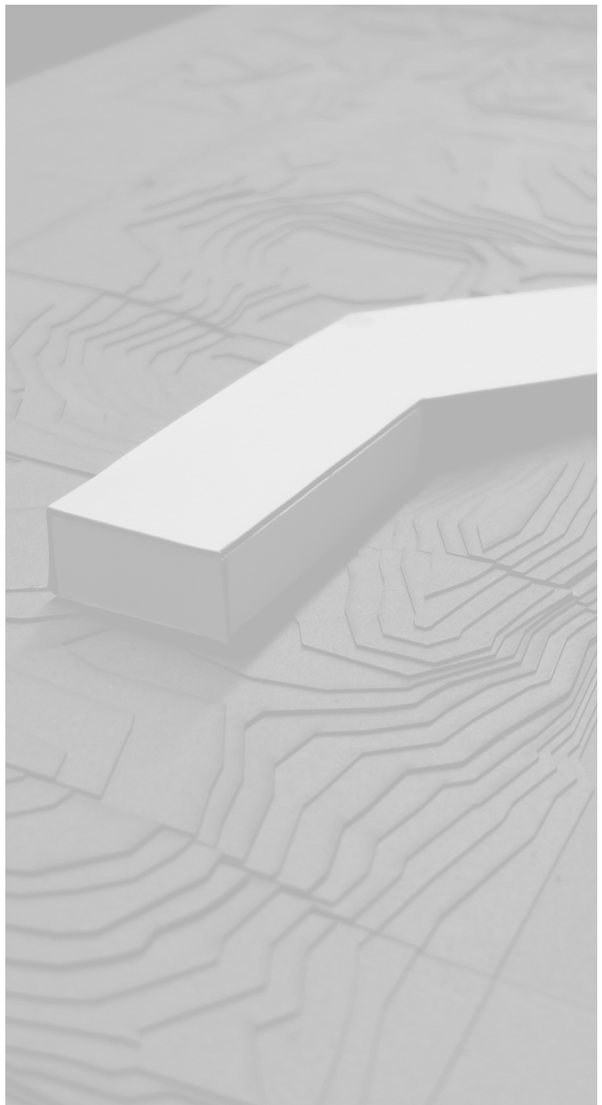
LITERATURE

CASE STUDIES



INTERVIEWS

ITERATIONS



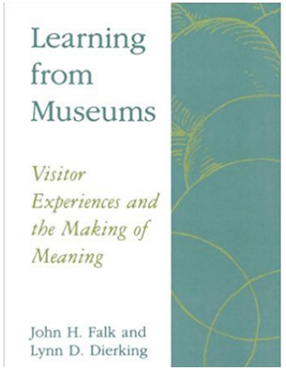
Go beyond experience, offer transformation: enduring memories, lasting changes that come from engaging and personalized experiences

Sociocultural dimension enhances the ability to remember the experience and shapes future experiences with the same events/ideas

“The exhibition space becomes a vessel in which objects, ideas, and people are brought together and transformed”
Kathleen McLean
LEARNING FROM MUSEUMS

“The best predictors of how visitors would remember, react to or act upon conservation related material were their degree of involvement in and knowledge about conservation issues.”
EVALUATING VISITOR CONSERVATION
RESEARCH AT THE MONTEREY BAY AQUARIUM

CURATOR



TED Ideas worth spreading

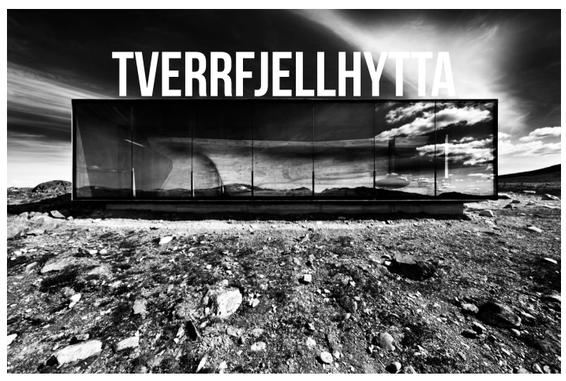

MONTEREY BAY AQUARIUM

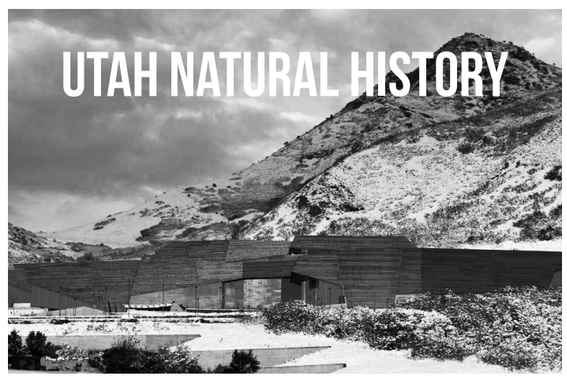

EXPLORATORIUM


CAPE HORN SUB-ARCTIC


PEROT


GREAT LAKES AQUARIUM

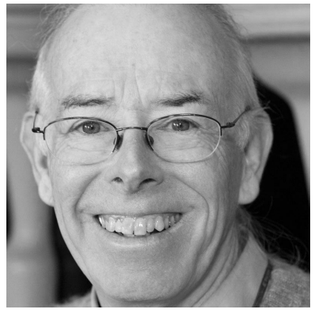

TVERRFJELLHYTTA


UTAH NATURAL HISTORY

INTERVIEWS

MIKE CARNEIRO
ONTARIO MINISTRY OF
NATURAL
RESOURCES AND FORESTRY

JESSE SCHOMBERG
MN SEA GRANT



PAUL DOHERTY
EXPLORATORIUM

ANTHONY FIORILLO
PEROT MUSEUM OF NATURE
AND SCIENCE

JAY WALKER
GREAT LAKES AQUARIUM

KIMBALL SUNDBERG
SEWARD ALASKA
SEA LIFE CENTER

KELLY SMITH
CARLTON SWCD

PAUL PEPE
THUNDER BAY TOURISM
DEPARTMENT

SAMPLE QUESTIONS

How often do you interact with members of the public for your work?

Do you think that ecological research would accomplish more with or without public input?

Do you find that a certain teaching style is most effective with getting information across in an interpretive center?

How do you view the visitors to your facility? Students? Partners? Skeptics?

What barriers keep you form effectively communicating your work to the public?

How can you best ensure that your message will influence the public?

What is the most essential space in your facility to ensuring that the mission of your institute is met?

What is the next step for interpretive centers?

SAMPLE QUESTIONS

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What is the next step for interpretive centers?

“Nobody flunks a museum: Frank Oppenheimer.”

PAUL DOHERTY

“Keep in mind many visitors to these facilities expect to be entertained, and learning is a side-bar.”

KIMBALL SUNDBERG

“We can actually get [the public] involved and participating in it through citizen science... Not only do they understand the work better, but they have greater trust in the outcomes of that work because they were involved with it...”

JESSE SCHOMBERG

“The public doesn’t have the background”

MIKE CARNEIRO

SEVERAL COMMONALITIES REPEATEDLY SHOWED UP THROUGHOUT THE RESEARCH. THESE ARE TREATED AS VITAL COMPONENTS OF THE FACILITY'S DESIGN.

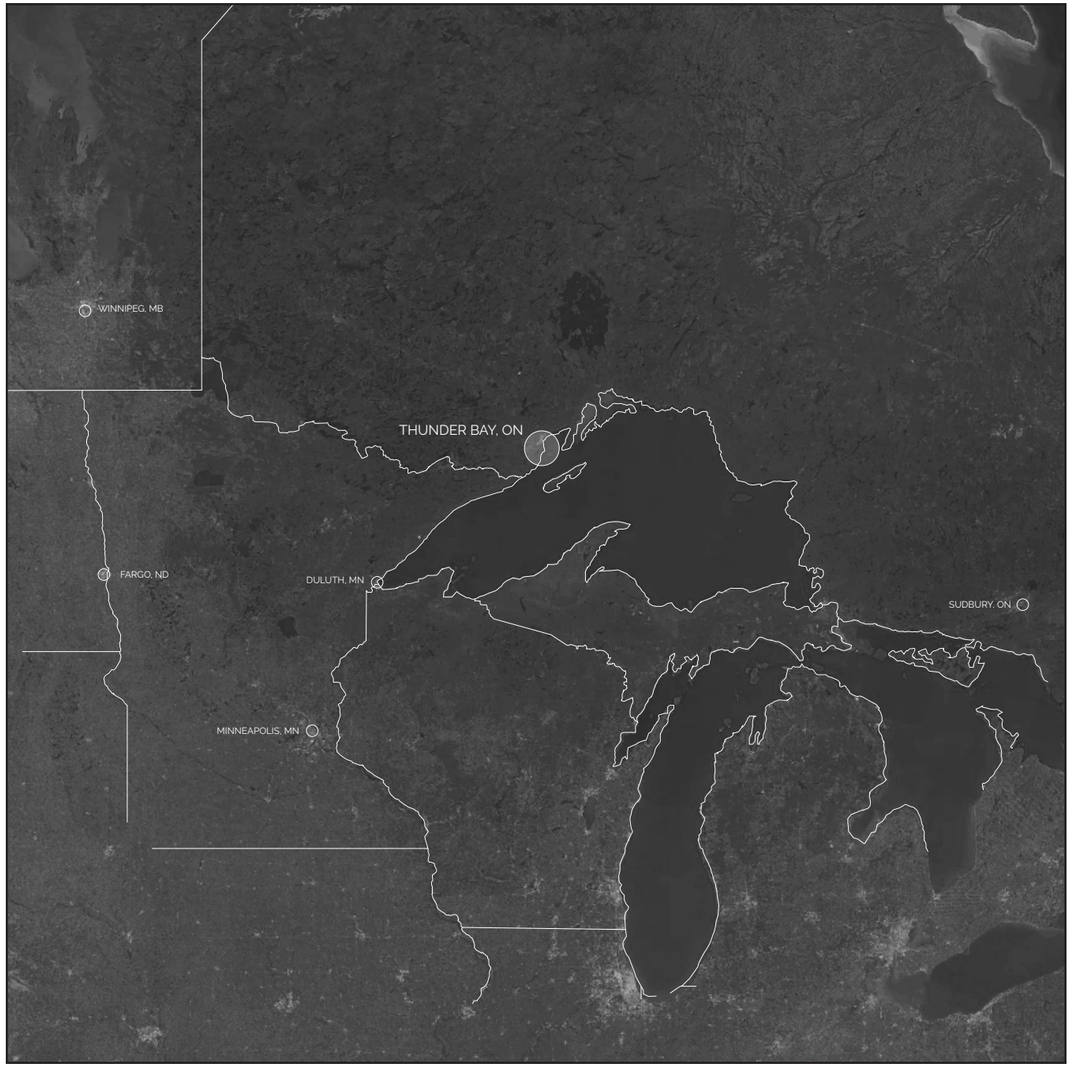
Interacting with science first hand provides the strongest connection to the material.

Take form inspiration from the surrounding landscape and the local culture.

Embrace a variety of learning styles to impart information to as diverse an audience as possible

Expose the research method to the public as much as possible.

REGION



UPPER MIDWEST

THUNDER BAY, LAKE SUPERIOR

THE GIANT ON THE HORIZON

THE SLEEPING GIANT

ENTRENCHED IN LOCAL LORE

"RESTING PLACE OF THE OJIBWAY GIANT NANABIJOU"

A DEFINING FEATURE OF THE HORIZON

ONE OF ONTARIO'S HIGHEST CLIFFS (700 FT/250 M)

ONE OF CANADA'S MOST BELOVED NATURAL LANDMARKS

WINNER OF CBC'S 7 "WONDERS OF CANADA" POPULAR VOTE (2007)


EASTERN FACE


CHIMNEY LOOKOUT


TALUS LAKE


THUNDER MOUNTAIN

PORT ARTHUR WATERFRONT

POOL 6

THUNDER BAY WATERFRONT DEVELOPMENT

THE NEXT PHASE OF THE THUNDER BAY'S WATERFRONT REDEVELOPMENT

Starting in 1975, Thunder Bay began to transition their waterfront from industrial to mixed us. The first phase of this plan, designed by Brook McIlroy, was opened to the public in 2011. The accolades and resulting revitalization of the neighboring downtown spurred the city to continue their plan to redevelop additional waterfront.

The Pool 6 area is set to counter to what has already been built, being more of a landscape than a concrete investment. Much of Pool 6 has been set aside for nature trails, revitalized natural ecosystems, and open fields. It is fitting to place a facility that respects the land and supports the wilderness that Thunder Bay is known for. By being located in such a prominent location the public will be able to easily interact with researchers there.

POOL 6

OCTOBER 1
2:00 PM

POOL 6

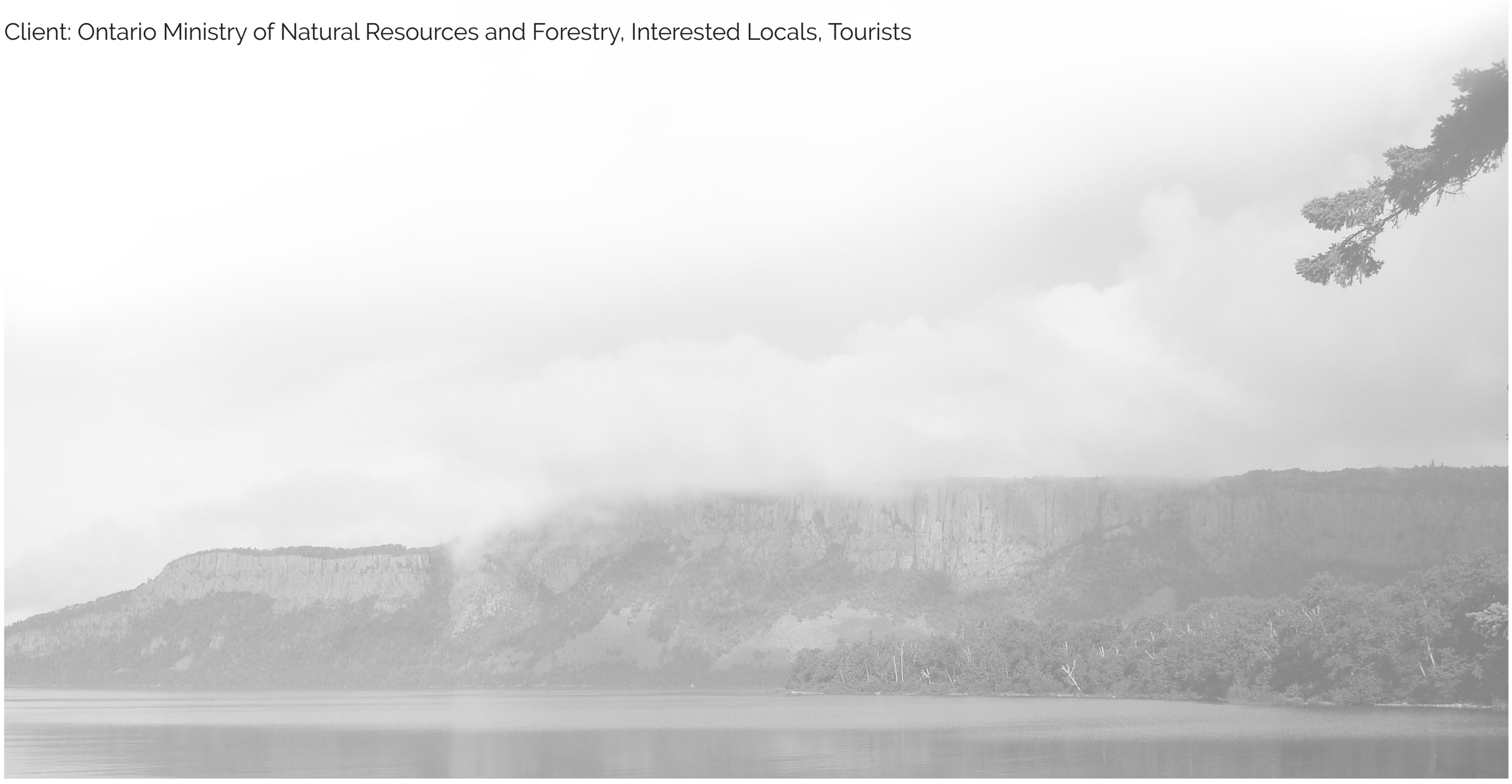
PANORAMA FROM WESTERN EDGE

THE DESIGN

THUNDER BAY ECOLOGICAL INTERPRETIVE CENTER

Providing an interface for people to be informed about the landscape that surrounds them.

Client: Ontario Ministry of Natural Resources and Forestry, Interested Locals, Tourists



RESEARCH

Monitor and support the ecosystems in the Thunder Bay Region. By doing so the land will remain health and an economic asset for the people who live there.

CITIZEN SCIENCE

Provide an outreach to visitors, both locals and tourists. Expose them to what ecological researchers do to reach logical conclusions about the state of the ecosystem.

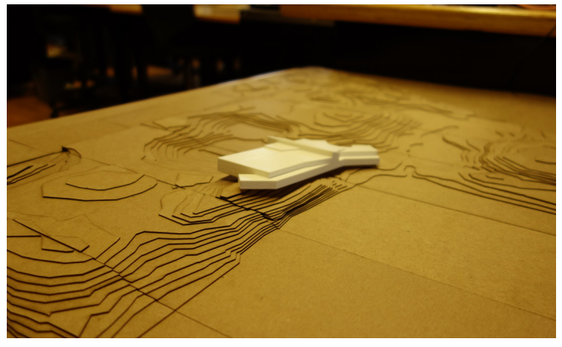
EXHIBIT

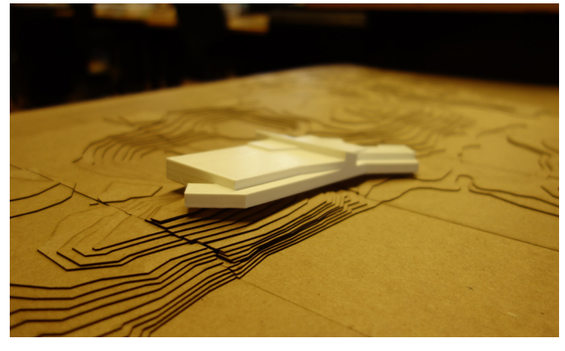
Inform visitors of the issues that the local landscapes face and provide suggested solutions to them. Take pride in the natural features in the area.

FORM ITERATIONS

PARALLEL THE NORTH SHORE

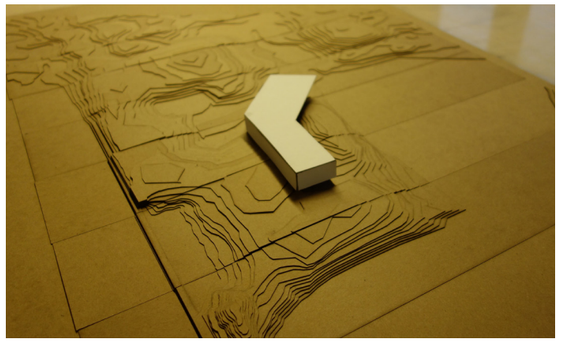
FORM 1

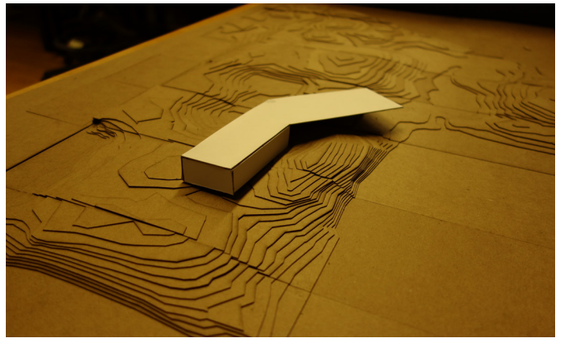




BRING VISITORS INLAND

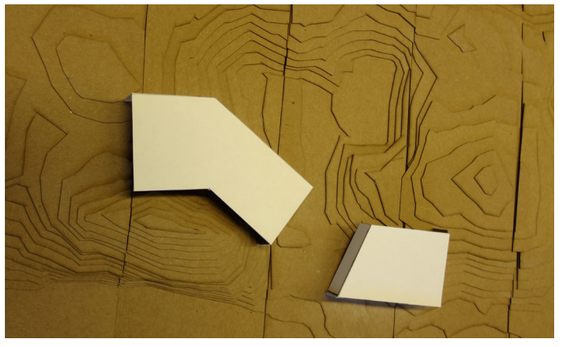
FORM 2

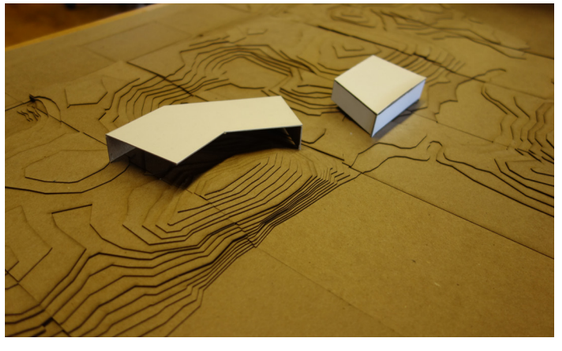




PROVIDE ACCESS TO THE WATER

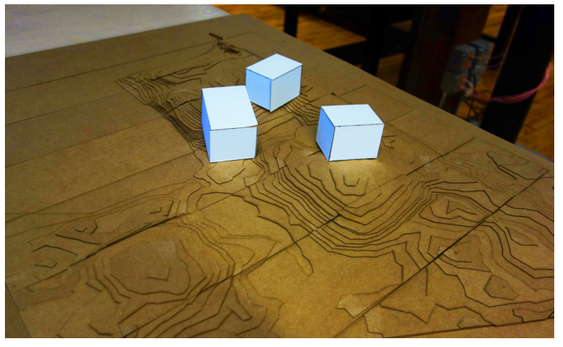
FORM 3

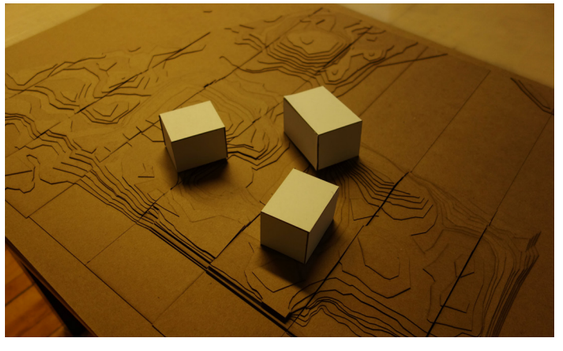




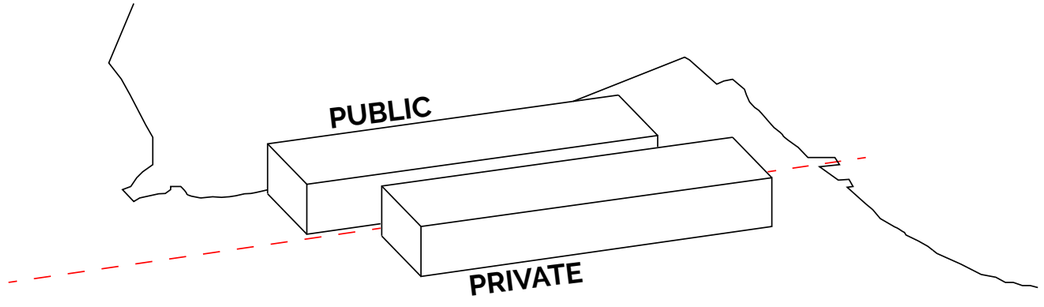
A CAMPUS OF STRUCTURES

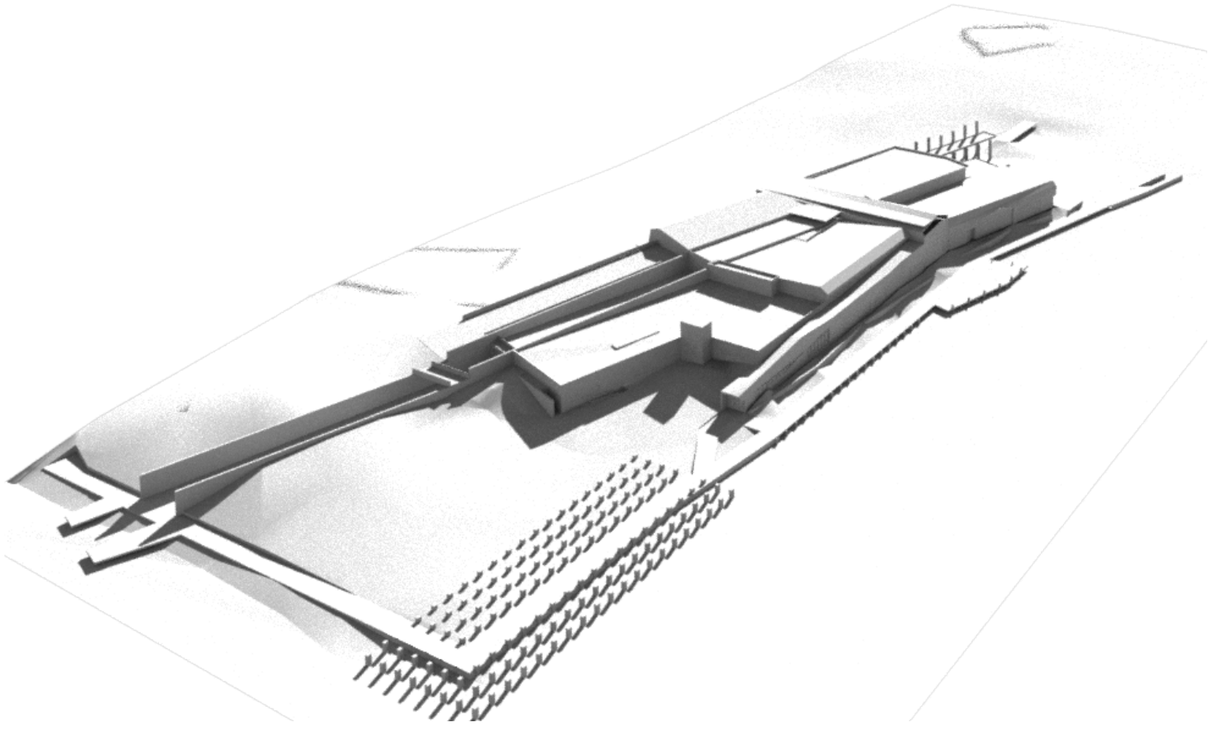
FORM 4





FINALIZED FORM



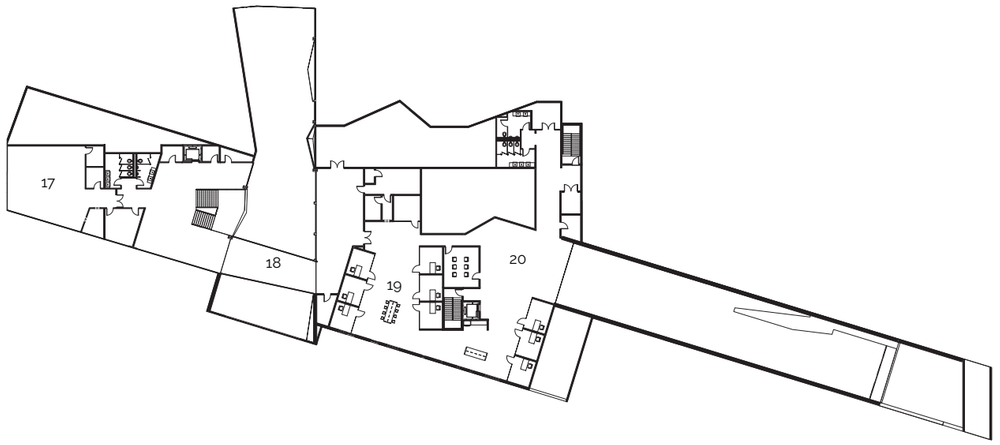


PROGRAM

CIRCULATION	12,700 SQ FT
ENTRANCE/LOBBY	2,900 SQ FT
LABORATORY	10,500 SQ FT
RESEARCH WORKSPACE	6,800 SQ FT
CAFE	2,100 SQ FT
GALLERIES	14,600 SQ FT
PRESENTATION	2,000 SQ FT
CITIZEN SCIENCE	5,000 SQ FT
FACILITATOR OFFICE/ADMINISTRATION	2,600 SQ FT
EDUCATION	1,800 SQ FT
WORKSHOP	1,100 SQ FT
MECHANICAL	7,800 SQ FT
RESTROOM	1,900 SQ FT

LEVEL 1	62,000 SQ FT
LEVEL 2	14,000 SQ FT
TOTAL	**77,000 SQ FT**

FLOOR PLANS



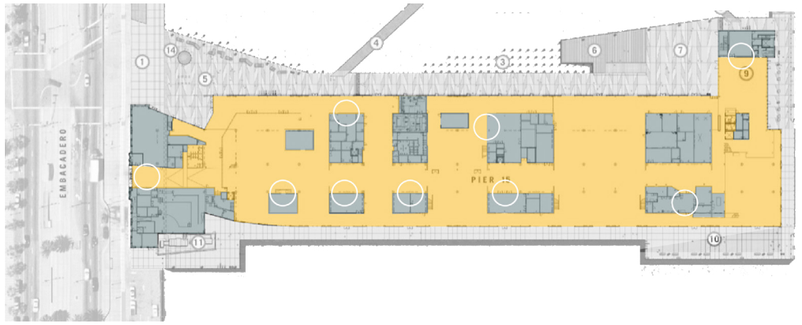
GROUND LEVEL

1	ENTRANCE/LOBBY	7	SLEEPING GIANT GALLERY	13	KITCHEN
2	CENTRAL ATRIUM	8	GALLERY	14	GIFT SHOP
3	INTERACTION SPACE	9	CLASS ROOM	15	AUDITORIUM
4	CITIZEN SCIENCE SPACE	10	WORKSHOP	16	CAFE
5	LABORATORY	11	PRESENTATION SPACE		
6	ARCHIVE	12	NORTH GALLERY HALL		

SECOND LEVEL

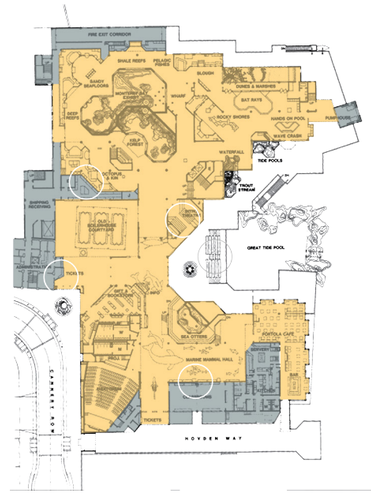
17	FACILITATOR OPEN WORKSPACE
18	BRIDGE
19	RESEARCH COLLABORATION
20	OPEN PLAN RESEARCH SPACE

PUBLIC + PRIVATE ANALYSIS



EXPLORATORIUM

GROUND FLOOR



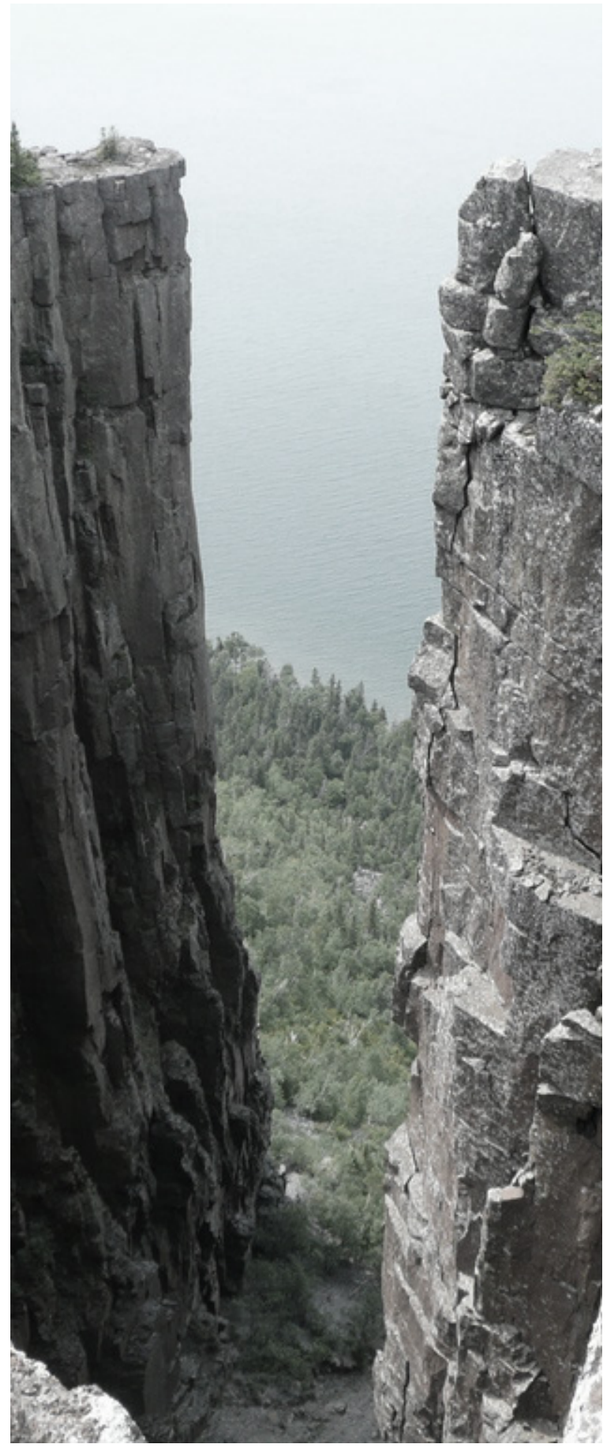
MONTEREY BAY AQUARIUM

UTAH NATURAL HISTORY MUSEUM

NORTH FACADE A

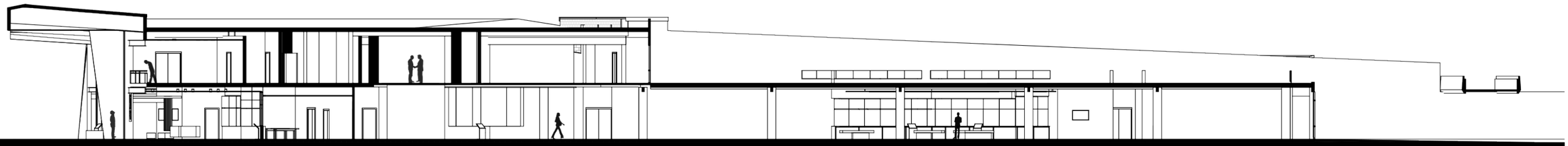
NORTH GALLERY B

CENTRAL ATRIUM C



LABORATORY VIEWING WINDOW D

ALONG THE SLEEPING GIANT



NORTH SECTION (SLEEPING GIANT GALLERY)

SLEEPING GIANT CHASM E

THANK YOU

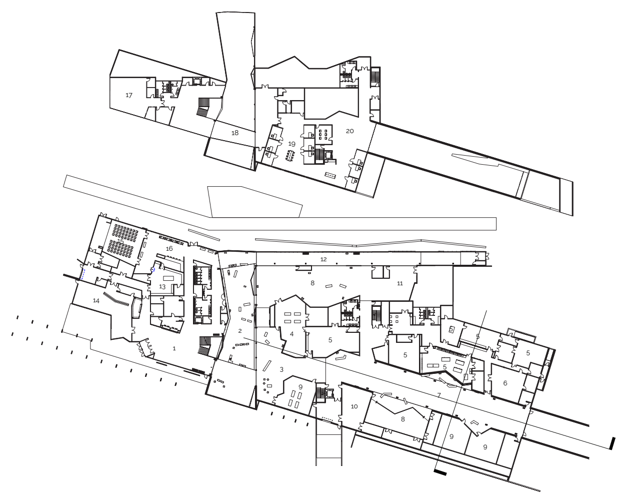
PRESENTATION BOARDS

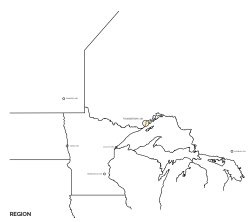
SECOND LEVEL
14,360 SQ FT

17 FACILITATOR OPEN WORKSPACE
18 BRIDGE
19 RESEARCH COLLABORATION
20 OPEN PLAN RESEARCH SPACE

MAIL LEVEL
62,583 SQ FT

1 TICKET HALL
2 CENTRAL ATRIUM
3 INTERACTION SPACE
4 CITIZEN SCIENCE SPACE
5 LABORATORY
6 ARCHIVE
7 SLEEPING GIANT GALLERY
8 GALLERY
9 CLASS ROOM
10 WORKSHOP
11 PRESENTATION SPACE
12 NORTH GALLERY HALL
13 KITCHEN
14 GIFT SHOP
15 AUDITORIUM
16 CAFE




REGION

SCALE: 1" - 26' - 0"


NORTH LAKE WALK VIEW

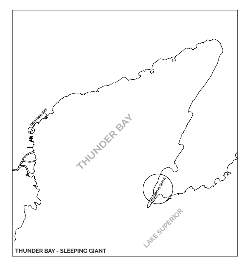

CITY

THE PROCESSION

Proceeding through the facility provides a syncopated rhythm of compressed, interior oriented spaces to expansive, outward facing canyons. Views that were withheld upon approach are revealed spectacularly from the interior. Vistas to the shoreline and distant cliffs draw people along the length of the galleries, depositing them at the foot of the wilderness.

THE SLEEPING GIANT

Thunder Bay, Ontario has long had a connection to the environment. Without the natural resources in the surrounding landscape the city would not have developed. Dominating the horizon is the most notable feature, the Sleeping Giant bluff across Lake Superior's Thunder Bay. Its ecological, symbolic, and spiritual significance gives a common identity for residents. Recent waterfront development has reclaimed the traditionally industrial shore for public and commercial use, allowing the city to get closer to its iconic landform.



THUNDER BAY - SLEEPING GIANT


CENTRAL ATRIUM


PUBLIC LABORATORY OBSERVATION WINDOWS


VIEW TO THE SLEEPING GIANT

CONNECTED BY NATURE

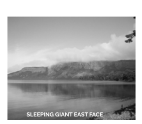
INTERPRETIVE SCIENCE CENTER THUNDER BAY, ONTARIO, CA

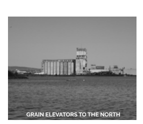
HOW CAN ARCHITECTURE FOSTER A STRONGER CONNECTION BETWEEN ECOLOGICAL CONSERVATION RESEARCH AND THE PUBLIC?

As humanity continues to expand the built environment the pressure placed upon the natural world continues to grow. The impact can be seen in the numerous issues A hard reevaluation of how humans should react is needed as we forge into the next era of the Anthropocene. Despite this, society has chosen to largely disregard the individuals tasked to solve it. Scientists continue to feel resistance to their findings from both the public at large and those in charge of implementing change. This mindset erodes the self righting nature of society.

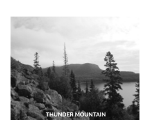
Providing a space that allows for interactions, transparency, and inspiration is an integral part to fix this discordance in our midst.

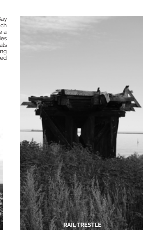
Interpretive science centers gained a major foothold since the mid-eighties when the Monterey Bay aquarium pioneered a new approach to presenting research to visitors. This now ubiquitous approach presents more than static exhibits, but an immersive experience. From here the next step is to provide a space for visitors to not only learn, but become part of the ecological research itself. Views to laboratories allow for people to see how science is conducted. Adjacent spaces for experts and interested individuals to work together benefit both group. Ecologists receive more support for their work while better educating visitors. By placing this facility along the reclaimed waterfront an easy connection to what is learned within the facility can be made to surrounding landscape.


SLEEPING GIANT EAST FACE


GRAIN ELEVATORS TO THE NORTH


WATERFRONT "LANTERN"


THUNDER MOUNTAIN


RAIL TRESTLE

INTERVIEWS

To provide insight into the needs and views of experts, a variety of interviews were conducted. Directors and scientists from some of the country's leading interpretive science centers participated. The questions asked varied from what they perceived to be essential to their work to how they interacted with the public. The responses gathered added to the literature research that explored how the general public can best be taught. The feedback provided better articulation of information that was in some cases absent from articles. Perceived success of outreach initiatives from those that perform them removed the idealized review that directors commonly provide.

1 ONTARIO MINISTRY OF NATURAL RESOURCES
THUNDER BAY, ON

Information provided gave insight into the public perception that scientists may have. Much of what the ministry does is report directly to lawmakers, skipping the crucial step of interacting with locals.

2 MINNESOTA SEA GRANT
DULUTH, MN

"[W]e can actually get [the public] involved and participating in [research] through citizen science. Not only do they understand the work better, but they have greater trust in the outcomes of that work because they were involved with it..."

3 EXPLORATORIUM
SAN FRANCISCO, CA

By showing the public live experiments they will be more engaged and inspired to take charge of their own lives.

"'Nobody flunks a museum' Frank Oppenheimer."

4 SEWARD ALASKA SEALIFE CENTER
SEWARD, AK

The main goal of a ecological center is to advance our knowledge of nature. Entertainment of visitors is secondary. This more research grounded approach emphasizes the importance of providing for the experts.

5 PEROT MUSEUM OF NATURE AND SCIENCE
DALLAS, TX

With the new Perot facility locals have been discouraged to be involved with the research process. Research is built upon the naturally curious. Interpretive centers are a platform for discussion.

6 GREAT LAKES AQUARIUM
DULUTH, MN

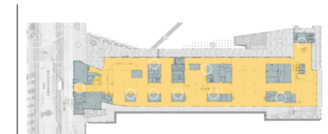
Visitors come to learn, but they can also inform the experts. Provide information using a variety of methods to ensure that the greatest range of people are included.

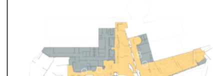

THUNDER BAY INTERPRETIVE CENTER GROUND FLOOR

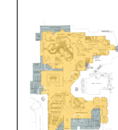
PUBLIC - PRIVATE ANALYSIS

To better understand what works for science centers, case studies on a wide variety of existing buildings were conducted. Focus was placed on observing how public and private space were treated, either distinctly separated or intermixed. A set of common features that were present on most examples was assembled. This language helped to inform what was required in plan for a successful facility.

The Thunder Bay Interpretive Center took these guidelines and modified them to fit its program and site. An effort has been made to give as much viewable frontage to research areas as possible. In several spots scientist are required to cross through public spaces. This creates points of spontaneous interactions between curious visitors and educated experts. Galleries have been placed next to laboratories and are given views to the environmental context which is referenced.


EXPLORATORIUM


NATURAL HISTORY MUSEUM OF UTAH

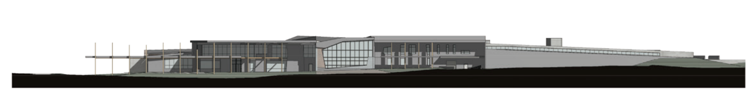

MONTEREY BAY AQUARIUM

CUES FROM CONTEXT

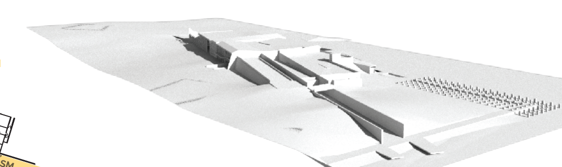
Providing a space for conservation ecologists to monitor the landscape and the public to learn about it, interpretive science centers serve as both a place of education and discovery. To take the next step is to integrate visitors into the research. This may be limited to showing research as it happens or going as far as to include the public in it.

The two main galleries take cues from the site. Oriented so as to respect the shore line and provide captivating views of the site to the visitors. Major circulation areas are resemble chimneys found on nearby rock formations. Their undulating form provides areas to gather along the edges while directing movement down their length. Laboratories are not just included within the building, but act as visual focal points. Axes point people towards the eastern end of the Pool 6 peninsula. From here, views that capture the land being managed are prominent.

The form is reminiscent of the buttes that dominate the landscape. Steep sides give way to lower flanking spaces meant to resemble the talus that cluster near the cliffs that they have fallen from. This idea is also reflected in the organic material pallet.


SOUTH ELEVATION

PLAN ORIENTATION


SOUTH EAST FROM WATER


WEST SECTION AT LABS


SLEEPING GIANT GALLERY NORTH SECTION

CONNECTED BY NATURE
ARCH 772 DESIGN THESIS EMERSON H. SMITH DAVID CRUTCHFIELD