



THE PLACE IN GIS PROJECT: MODELLING PLACE ATTACHMENT IN COLLIERY DAM PARK AND BEYOND

BRAD MAGUIRE

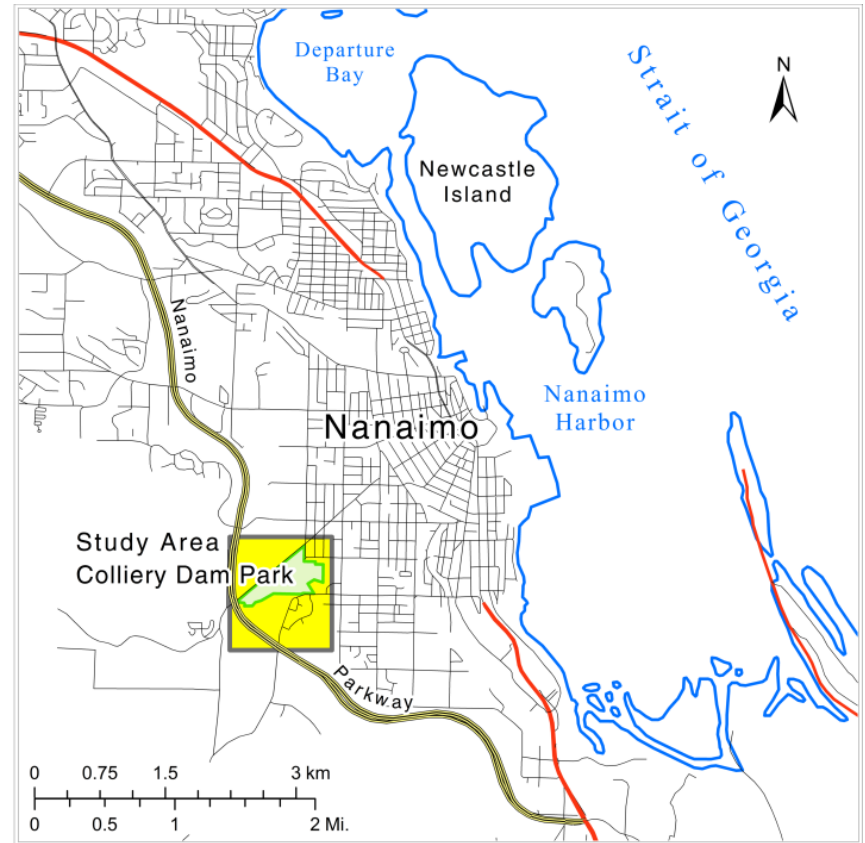
2017.09.26

WHAT IS 'PLACE'?

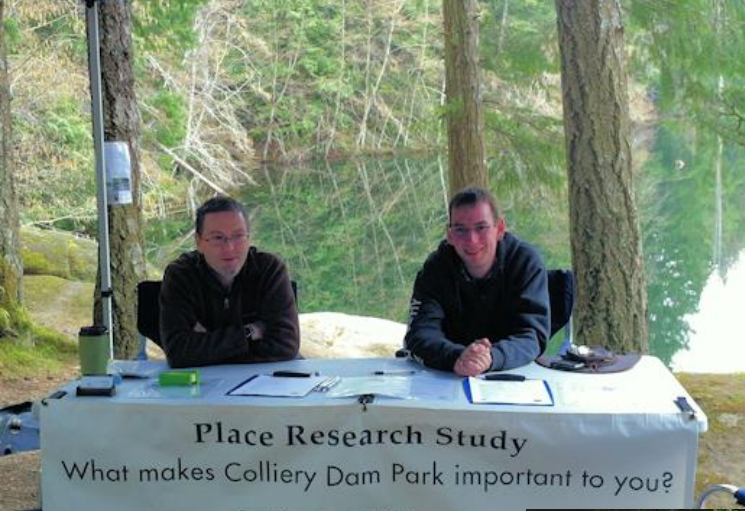
- 'Place' (singular) is a catch-all phrase that includes items common to places everywhere.
 - While there are many *places*, they are all incorporated into the study of *place*.
 - Studies of place look at:
 - The resources that places provide
 - How people navigate around and through places
 - The porousness of place boundaries
 - The factors that act to build and destroy places
 - The environment of places
 - The psychological importance of place

COLLIERY DAM PARK

- Study Area



WHAT IS THIS 'PLACE'?



2017.06.09

PLACE ATTACHMENT

- Place Attachment "is a bond between people and their environment" (Moore & Graefe, 1994; Williams et al., 1992)
 - Place attachment can be broken down into 4 components (Williams & Vaske, 2003), of which 2 are significant:
 - Place Dependence: The physical needs that are met by place
 - Place Identity: The emotional needs that are met by place.

WHY PLACE ATTACHMENT IS IMPORTANT

- Although Place Attachment is difficult to measure, Place Dependence and Place Identity are not.
- By asking about people's needs and the emotions that they associate with a place, we can estimate the place attachment.
- This allows us to map Place Attachment

DATA COLLECTION PROCEDURES

- Features collected in advance to create a catalog
 - Precisely located features
 - Points, Lines, or Polygons
 - Method is not scale dependent
- Surveyed 302 Participants over 11 months
 - In-situ data collection
 - 6 Data collection sites
 - Immediate, direct, relatively unbiased
 - People described their place dependence and place identity for multiple features in Colliery Dam Park

DATA COLLECTION PROCEDURES

Questionnaire

PlaceInGIS.com

Participant 362199345

To be Completed by Participant

In this section, we want to know what you think and feel about particular features in the park. We want to know how important each feature is, why the feature is important to you, how far away you notice the feature. In addition, we would like to know how you feel about the park overall. An additional form is available if you would like to describe more than seven features.

Feature Name	Main Emotion (see card)	Reason for Importance / Comments (optional)	Importance (1 - 7, see below)	Awareness Distance (metres or V, see card)
Colliery Dam Park (overall)				
UPPER LAKE DAM	Amusement	SWIM FOR MILLIONS ALSO Joy, serenity, Calmness (DOGS OFF LEASH)	6	50M
UPPER LAKE ^{BIGGEST} WATER	PLEASURE	Amusement, distraction, (BEAUTY OF NATURE)	6	100M
LOWER LAKE PATH	ANNOYANCE	DOGS NOT ALLOWED TO SWIM LITTLE BEACH. LOWER LAKE	7	100M
	AMUSEMENT	COMPLETION OF WHOLE AREA	7	100M
RESERVOIRS	SATISFACTION	WATER SUPPLY KEPT AVAILABLE/CLEAN	7	100M
BIG ROCKS (WITH MOSS ON PATH SHADDED)	JOY	BEAUTY OF NATURE	7	100M
Main Purpose for Today's Visit: Walking <input checked="" type="checkbox"/> Running <input type="checkbox"/> Walking Dog <input checked="" type="checkbox"/> Swimming <input type="checkbox"/> Sunbathing <input type="checkbox"/> Commuting <input type="checkbox"/> Cycling <input type="checkbox"/> Fishing <input type="checkbox"/> Other _____			<input type="checkbox"/> 7 = Very Important <input type="checkbox"/> 6 = Important <input type="checkbox"/> 5 = Somewhat Important <input type="checkbox"/> 4 = Neutral <input type="checkbox"/> 3 = Somewhat Unimportant <input type="checkbox"/> 2 = Unimportant <input type="checkbox"/> 1 = Very Unimportant	
How many years have you been visiting this park: Less than 1 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5-7 <input checked="" type="checkbox"/> 8-10 <input type="checkbox"/> More than 10 <input type="checkbox"/>				
How often do you visit the park: Daily <input type="checkbox"/> Several Times a Week <input checked="" type="checkbox"/> Weekly <input type="checkbox"/> Every 2 Weeks <input type="checkbox"/> Monthly <input type="checkbox"/> Infrequently <input type="checkbox"/>				

In this section, we would like to collect some information about you to help us determine whether males, females or people in different age categories or ethnic groups see their parks differently. We are requesting your postal code so that we can determine roughly where you live in relation to the park. If you are not a resident of British Columbia, please enter "outside" as your Postal Code.

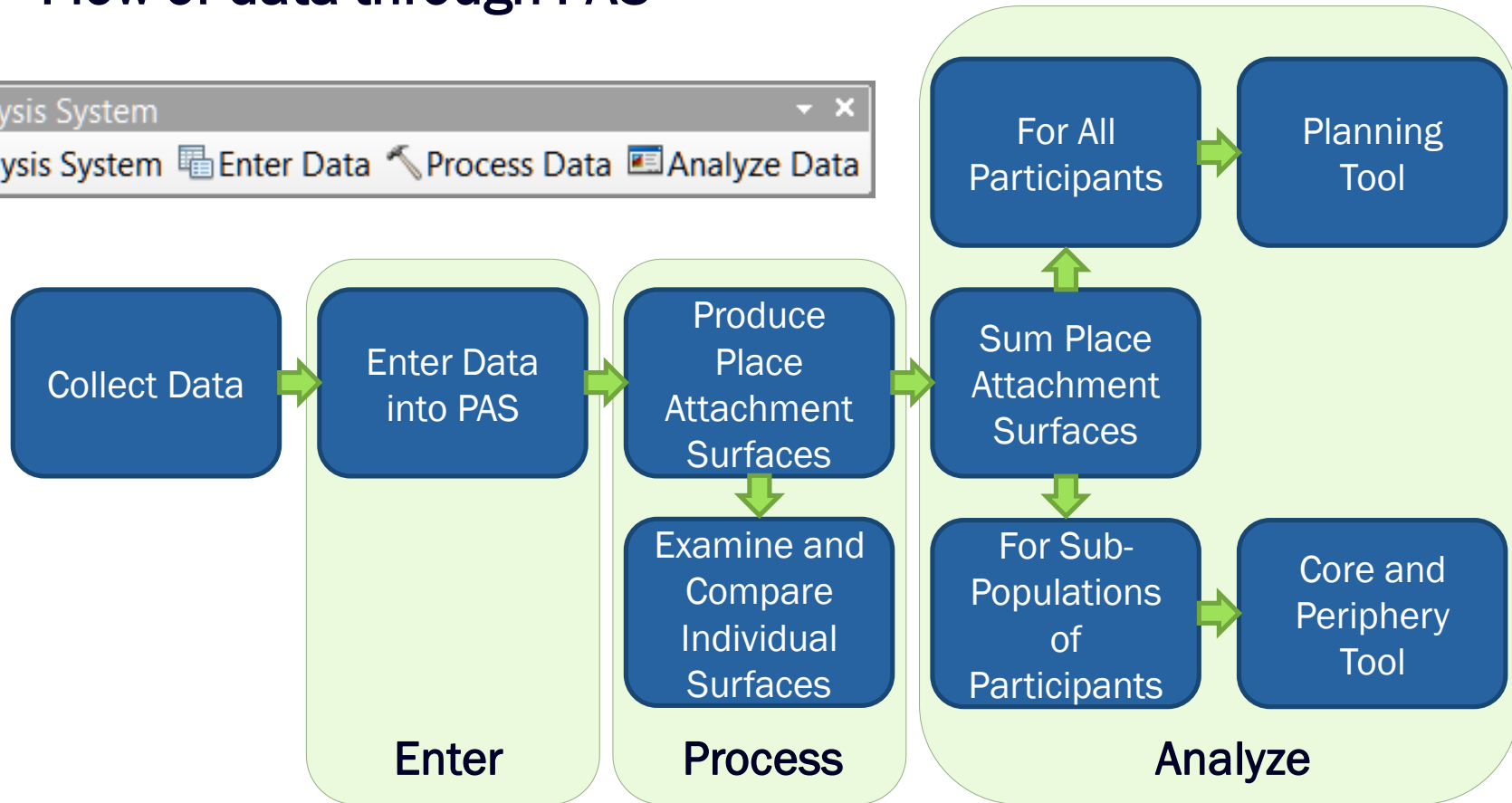
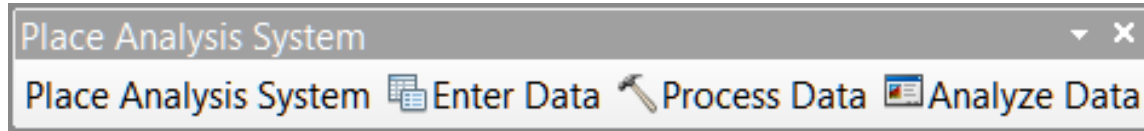
Age: 49	Gender: M <input type="checkbox"/> F <input checked="" type="checkbox"/>	Postal Code: V9S 1C7	Occupation: PHYSIOTHERAPIST
What is the highest level of education that you've completed: Elementary <input type="checkbox"/> Secondary <input type="checkbox"/> University/College <input checked="" type="checkbox"/> University Postgraduate <input type="checkbox"/>			
If you wish to be identified as a member of an ethnic group, please write it here (optional):			

DATA PROCESSING

- The *Place Analysis System (PAS)*, a custom Geographic Information System application, was built to collect, store, display and analyze data from participants
- Proof of Concept
 - Programmed in ArcGIS using Visual Basic for Applications
 - 3 buttons, 24,000 lines of code

DATA PROCESSING

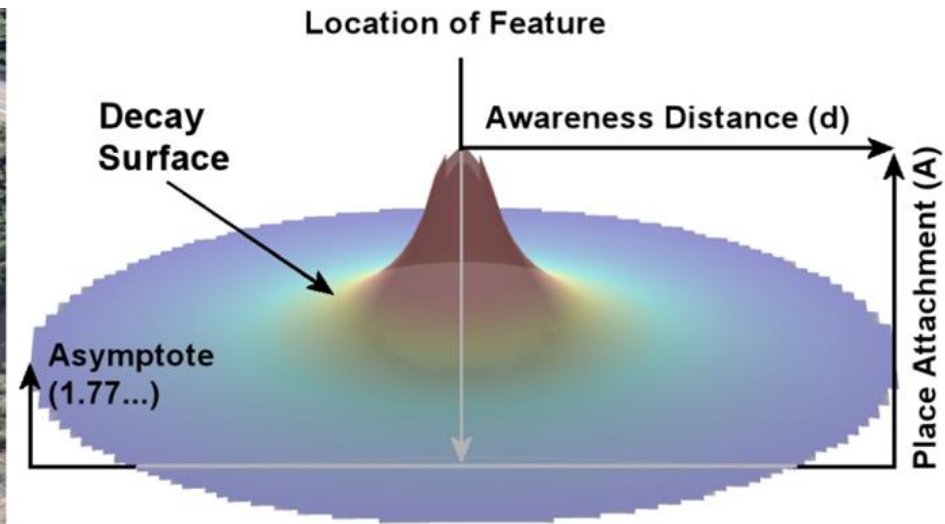
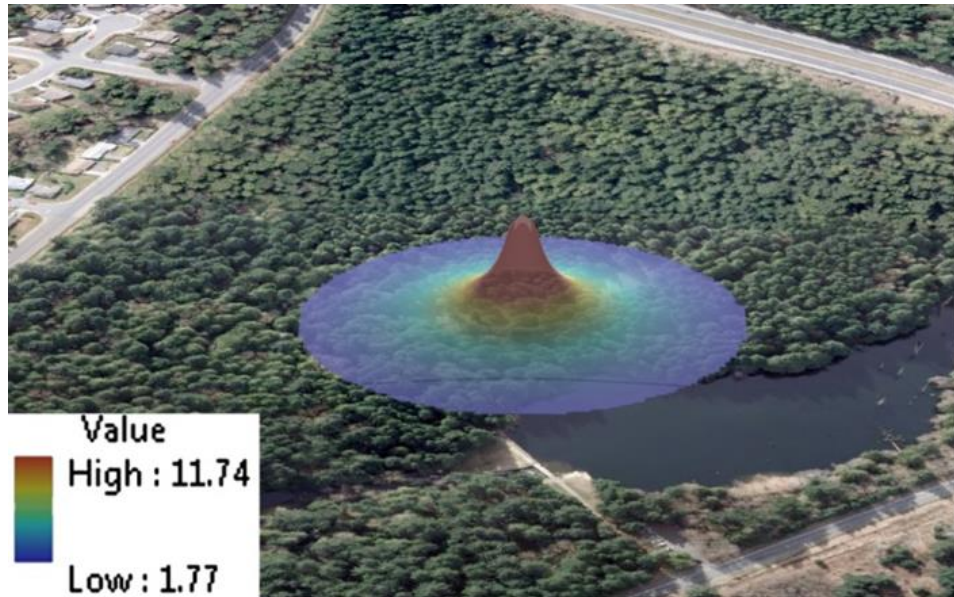
- Flow of data through PAS



DATA PROCESSING

- **Three Critical Pieces of Information for each Feature**
 1. Emotion → Place Identity (Plutchik, 1980)
 2. Importance → Place Dependence
 3. Awareness Distance
- **Decay Surface Calculation**
 - Place Identity and Place Dependence are combined to estimate Place Attachment (the height of the feature)
 - Awareness Distance used to calculate the distance at which 'background' place attachment values are reached (the width of the feature)
 - Decay curve for each feature calculated based on height and width values

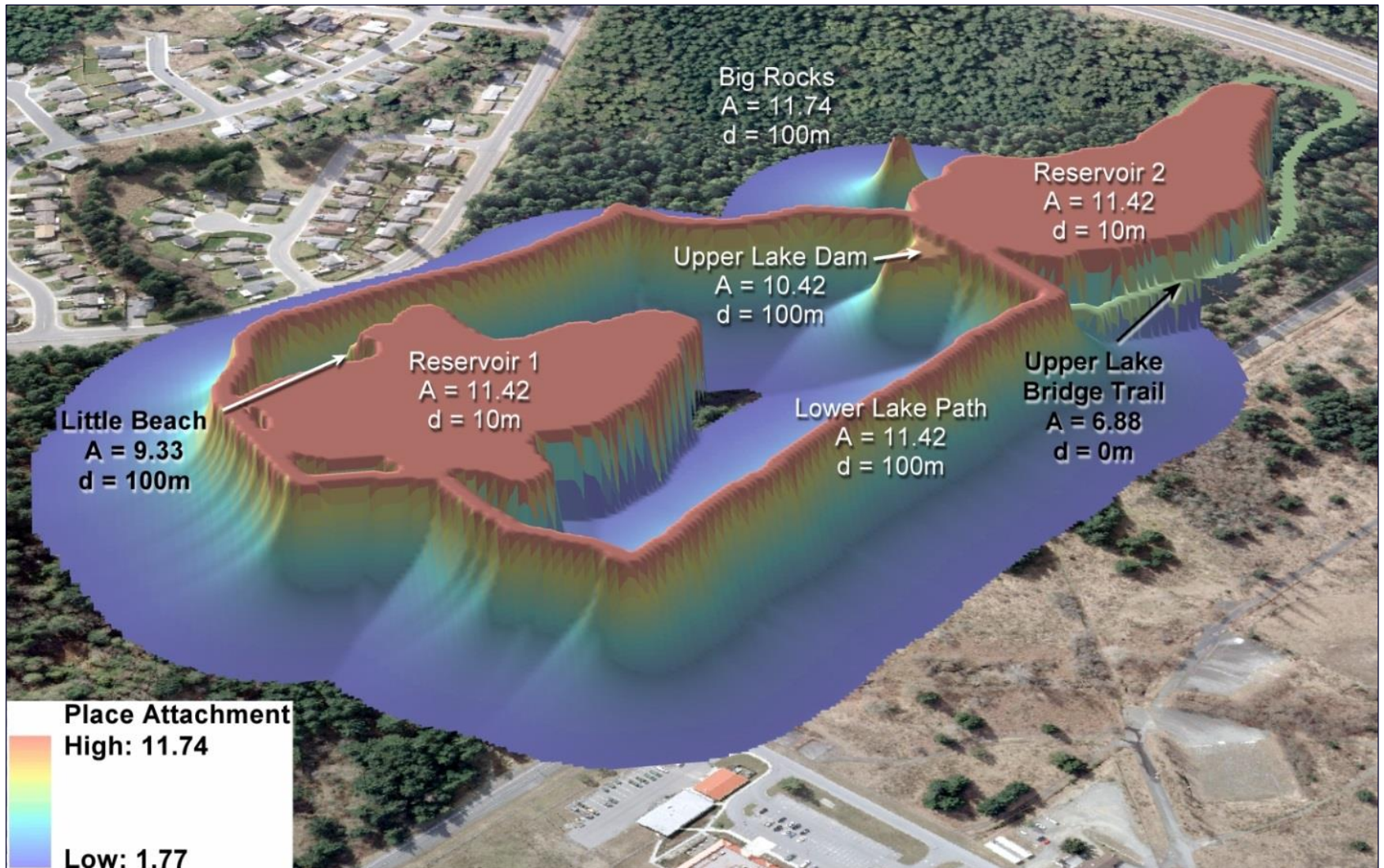
DATA PROCESSING



- Decay surfaces based on psychological studies of how emotional intensity decays with distance (Dornič, 1967)
 - Combines decay surfaces using a Fuzzy OR operator

DATA PROCESSING

- Creation of a Place Attachment Surface

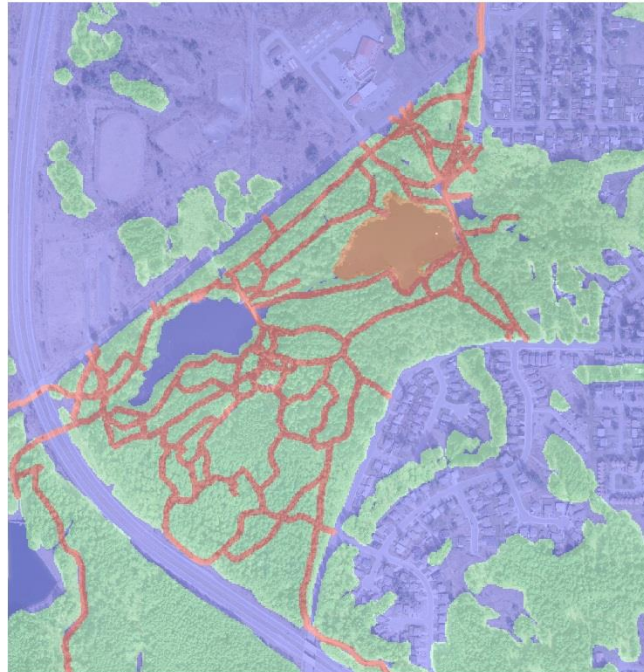


EXAMPLE PLACE ATTACHMENT SURFACES

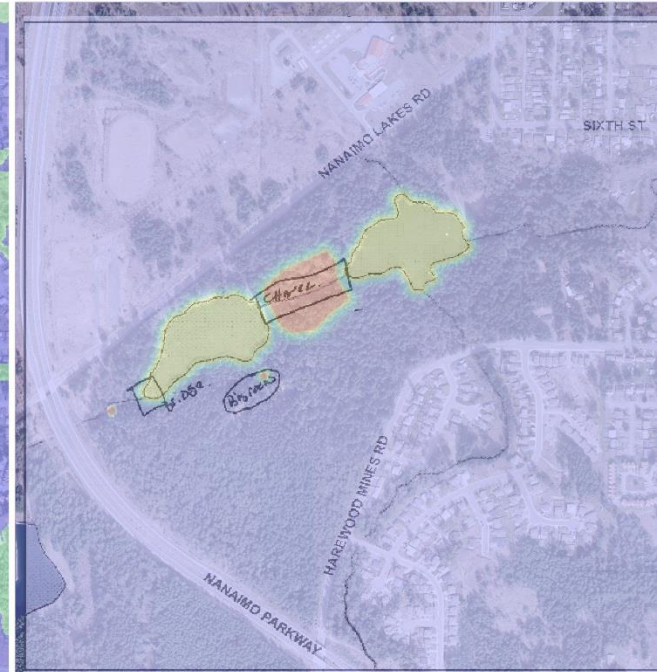


a.

b.

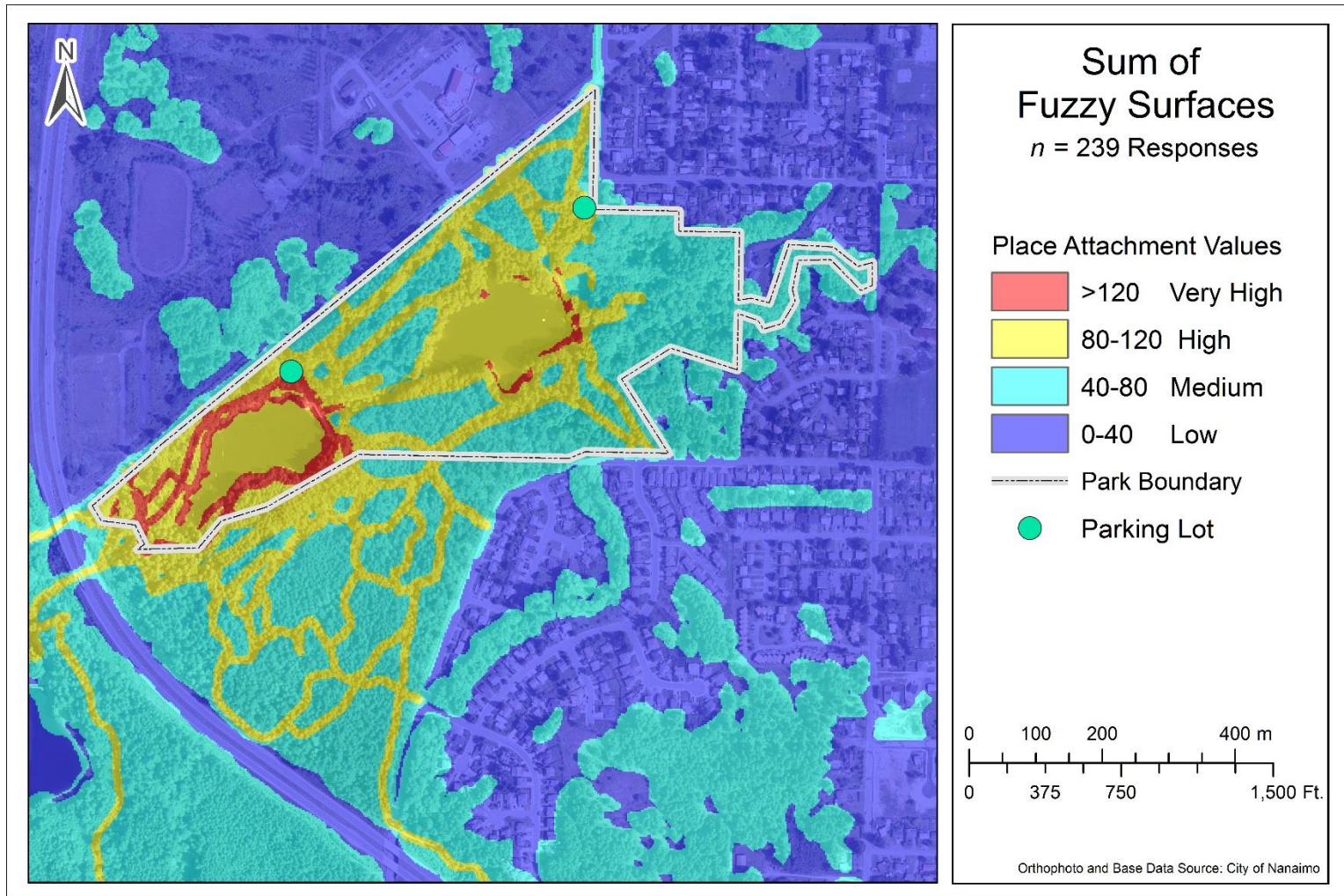


c.



d.

COMBINED PLACE ATTACHMENT SURFACES



WHAT'S NEW?

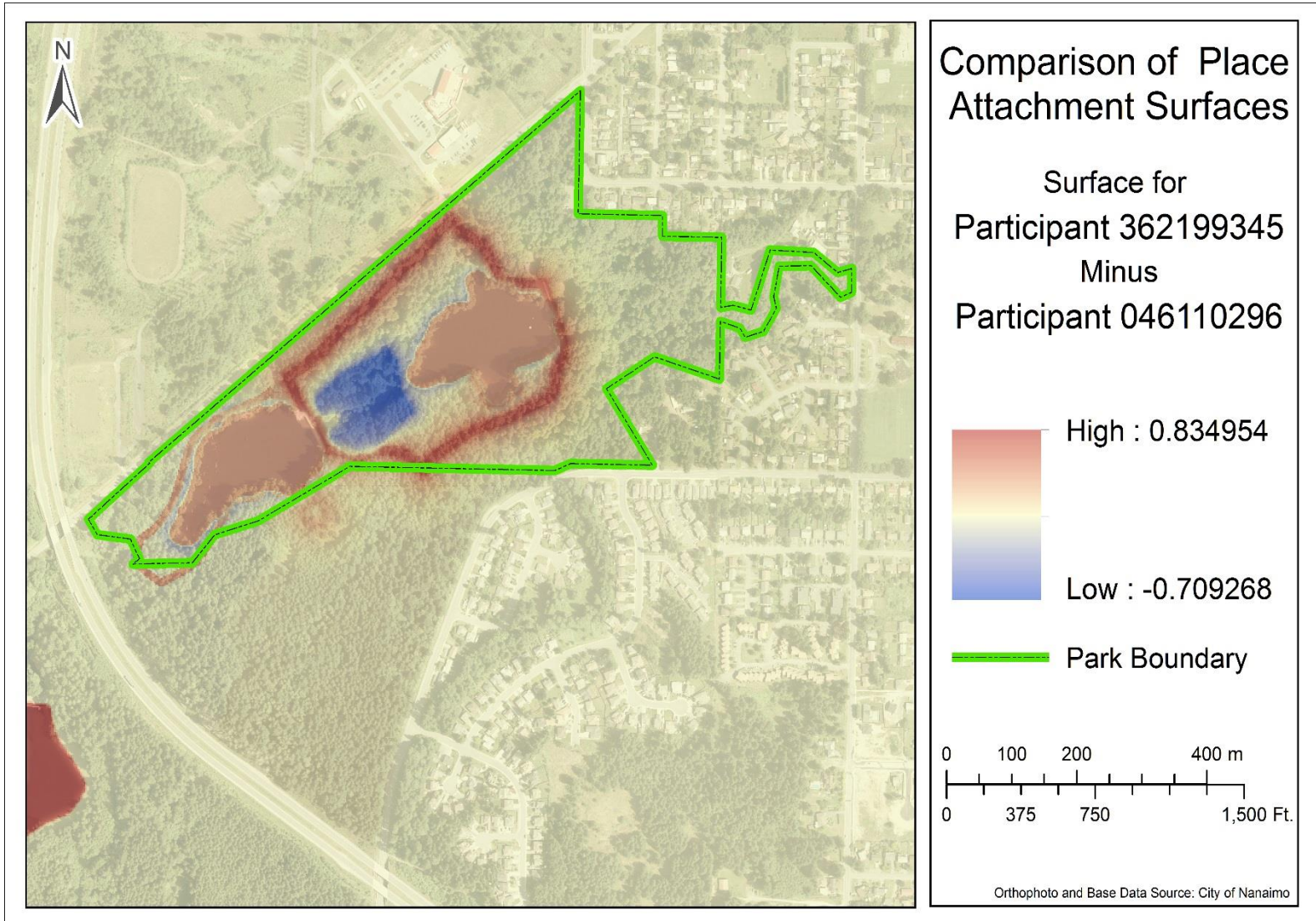
- **Last presentation 2012**
 - Data collection software barely operational
 - Data were still being entered
 - First place attachment surfaces generated
- **Advances since then**
 - Data fully entered
 - All surfaces have been entered and method has been partially validated
 - Analytical tools have been developed
 - Create group place attachment surfaces
 - Create discrete boundaries from fuzzy surfaces
 - Automatically create core and periphery areas for groups

INITIAL FINDINGS

- **Place Attachment Surfaces**
 - A person's relationship to place is very personal
 - Individual Surfaces can be compared by subtraction
- **Planning Tools**
 - Shows potential to identify different options based on place attachment
- **Core and Periphery Analysis**
 - We have identified a core and a periphery area for the park based on all participants
 - Place attachment is a product of many factors, including gender, age class, distance to home, season, & weather

INITIAL FINDINGS

■ Comparison of Surfaces



INITIAL FINDINGS

- Planning Tool Results

-

Results

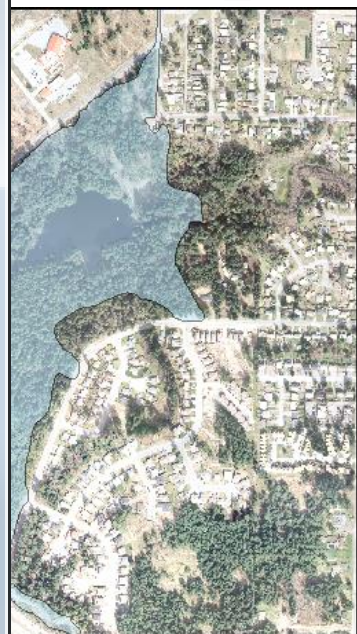
Top 7 Results for Core and Periphery

- Peak 1 (Core): Position 534
- Peak 3 (Core): Position 484
- Peak 4 (Core): Position 674
- Peak 6 (Core): Position 689
- Peak 9 (Core): Position 533
- Peak 10 (Core): Position 504
- Peak 11 (Core): Position 682
- Peak 2 (Periphery): Position 414
- Peak 5 (Periphery): Position 381
- Peak 7 (Periphery): Position 413
- Peak 8 (Periphery): Position 374
- Peak 12 (Periphery): Position 373
- Peak 15 (Periphery): Position 438
- Peak 20 (Periphery): Position 452

Run Complete.

Close

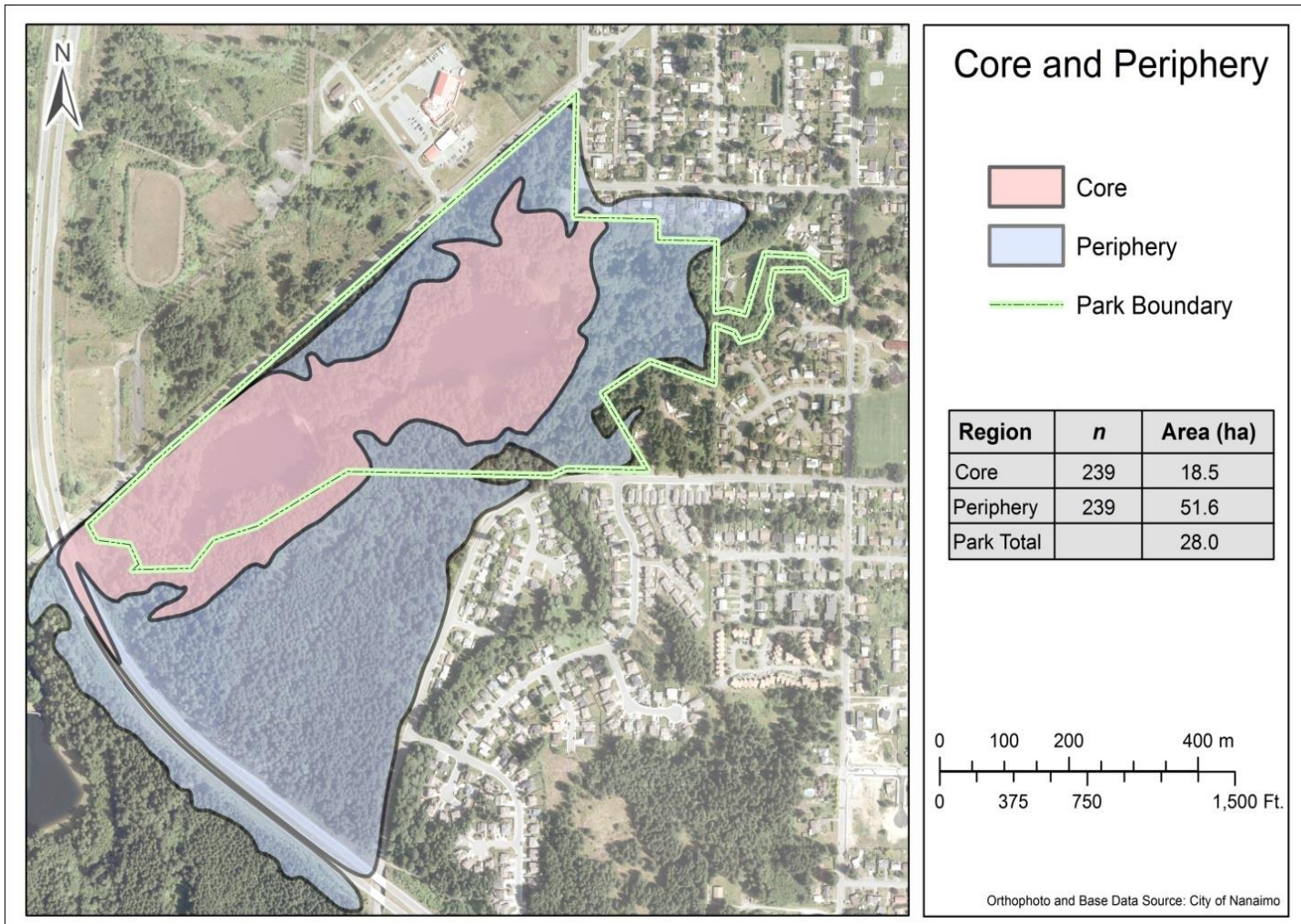
438_1000

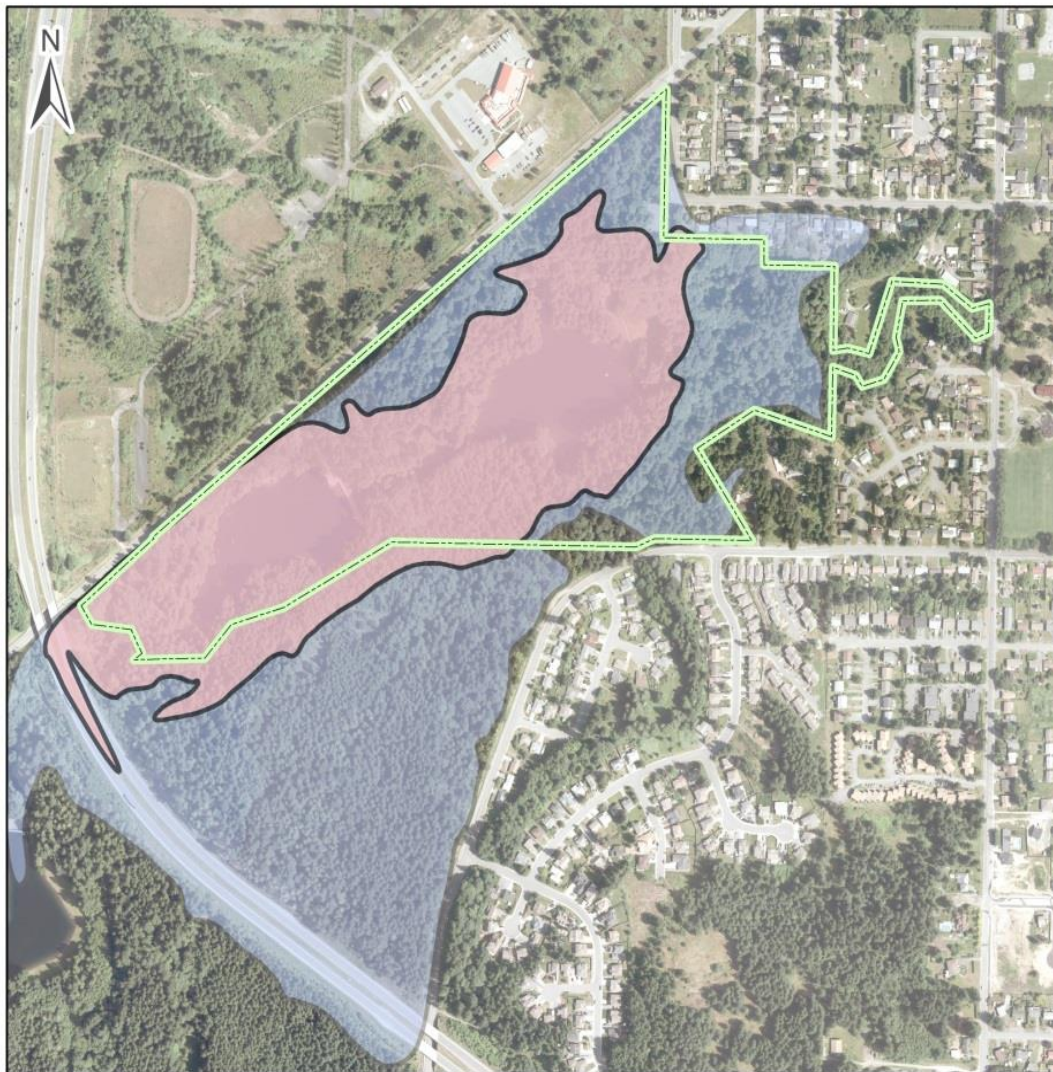


500 1,000 m

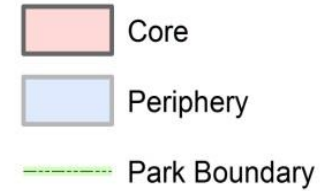
INITIAL FINDINGS

- Core and Periphery Tool
 - Results for all participants

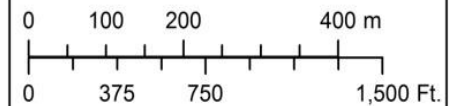




Core and Periphery Male Participants



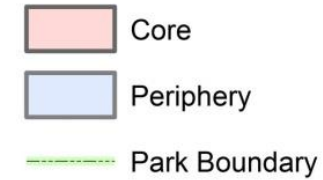
Region	<i>n</i>	Area (ha)
Core	121	20.0
Periphery	121	52.2
Park Total		28.0



Orthophoto and Base Data Source: City of Nanaimo

■ Differences by gender

Core and Periphery by Age Classes



Age 1 - 20



Age 21 - 40

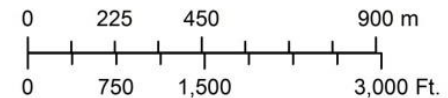


Age 41 - 60



Age 61 +

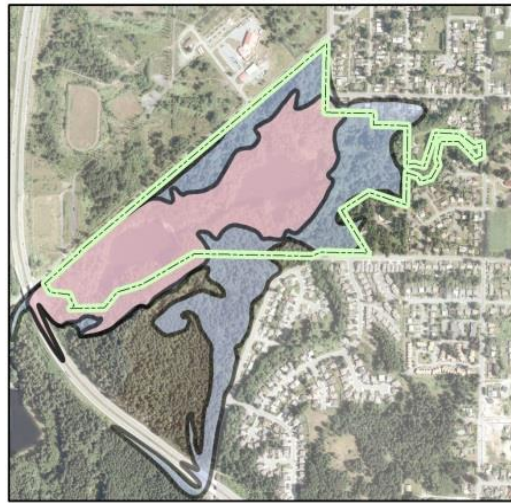
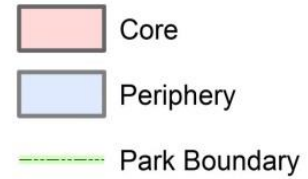
Age Class	<i>n</i>	Core Area (ha)	Periphery Area (ha)
1- 20	16	19.7	73.3
21 - 40	84	15.0	51.0
41 - 60	83	18.5	49.2
60 +	34	16.6	28.5



Orthophoto and Base Data Source: City of Nanaimo

- Differences by age class

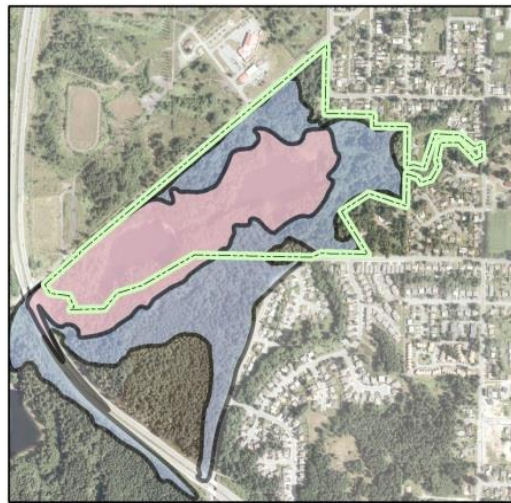
Core and Periphery by Distance Classes from Home to Colliery Dam Park



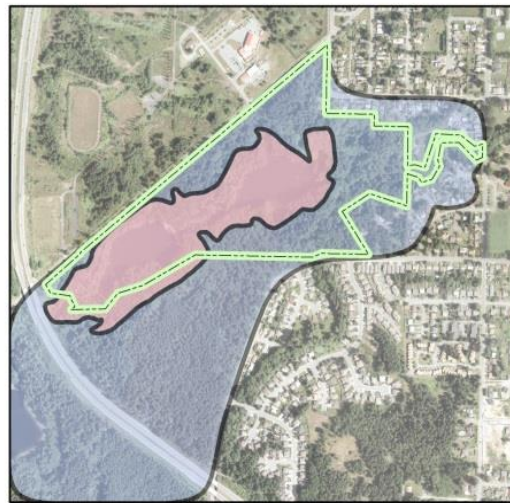
0 - 1000 m



> 1000 - 2000 m

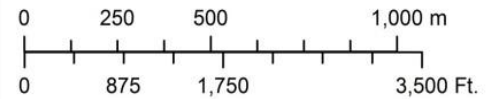


> 2000 - 3000 m



> 3000 m

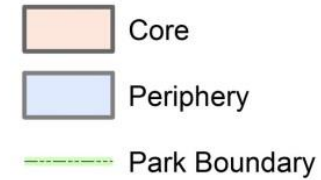
Distance Class	<i>n</i>	Core Area (ha)	Periphery Area (ha)
0-1000m	55	18.9	37.7
>1000-2000m	52	18.4	25.4
>2000-3000m	36	17.4	40.5
>3000m	36	14.9	73.3



Orthophoto and Base Data Source: City of Nanaimo

- Differences by distance between home and park

Core and Periphery Participants Reporting by Season



Season	<i>n</i>	Core Area (ha)	Periphery Area (ha)
Spring	62	5.6	40.2
Summer	87	12.7	35.2
Autumn	60	15.9	36.7
Winter	30	3.9	53.9



Spring



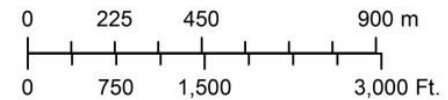
Summer



Autumn



Winter

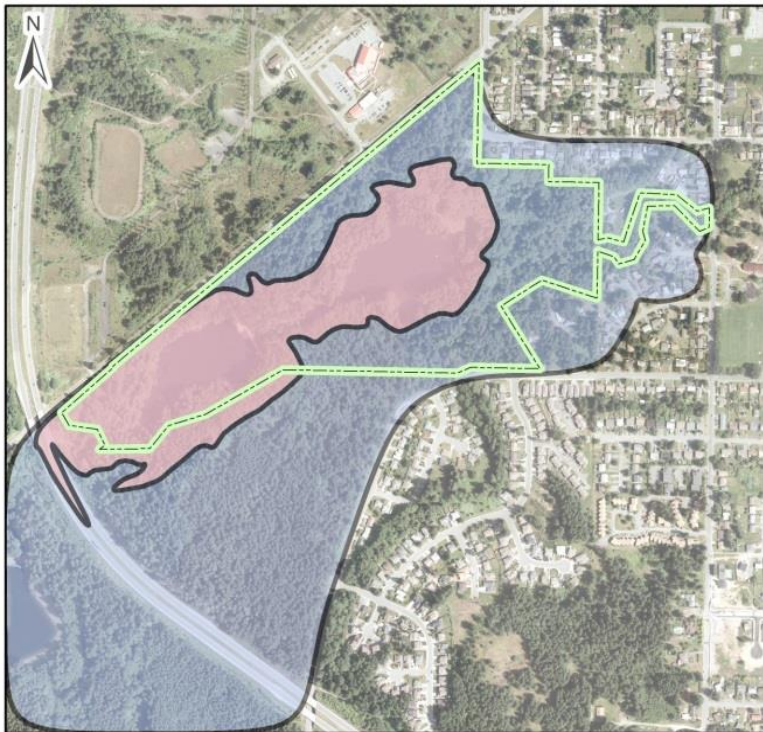


Orthophoto and Base Data Source: City of Nanaimo

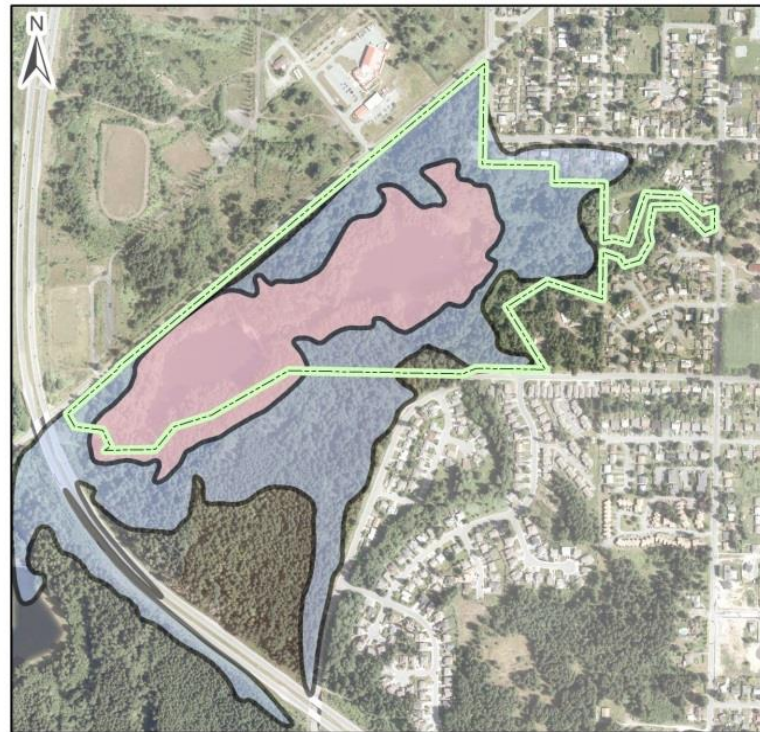
- Differences by traditional season

Core and Periphery

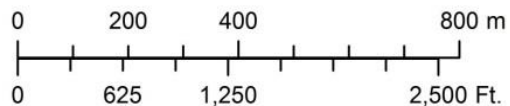
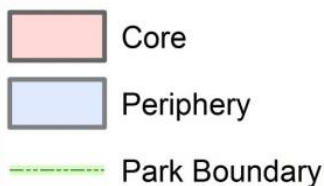
Dry Versus Wet Seasons



Dry Season (April - September)



Wet Season (October - March)



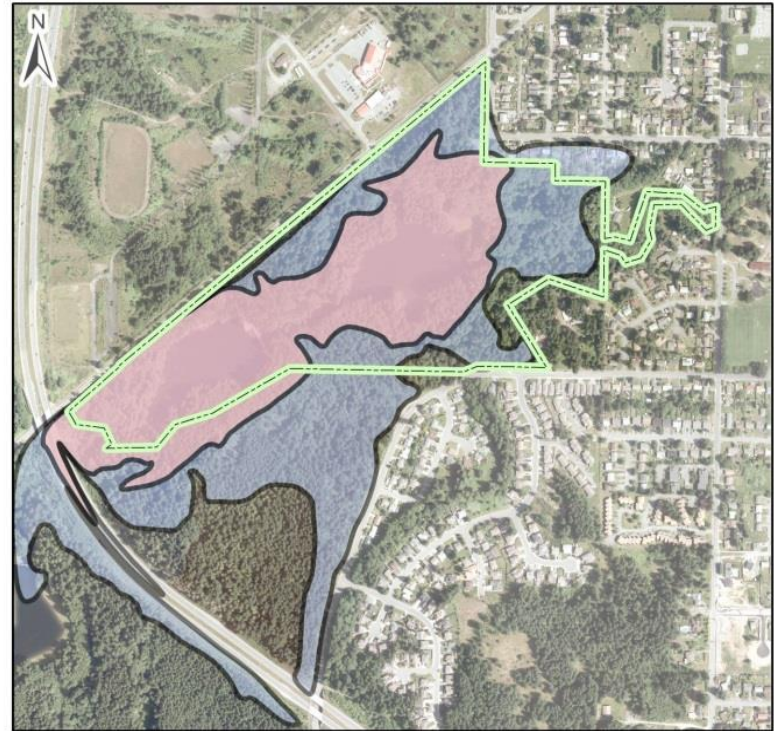
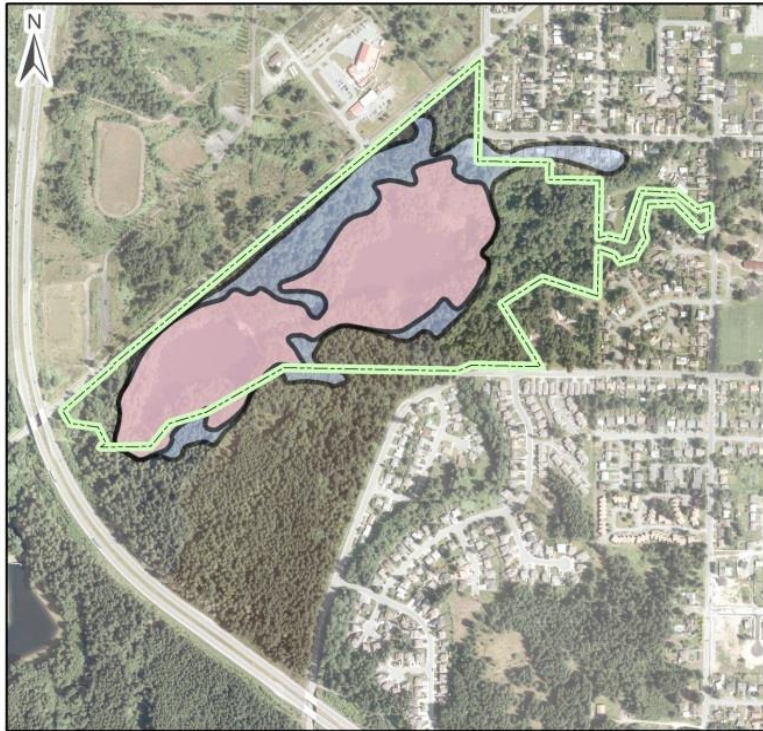
Orthophoto and Base Data Source: City of Nanaimo

	Dry Season		Wet Season	
Region	<i>n</i>	Area (ha)	<i>n</i>	Area (ha)
Core	144	17.3	95	14.8
Periphery	144	73.3	95	42.4

- Differences by "dry" (April-Sept.) vs. "wet" (Oct.-Mar.) season

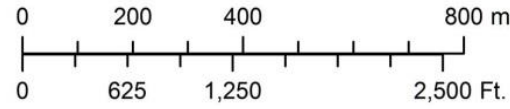
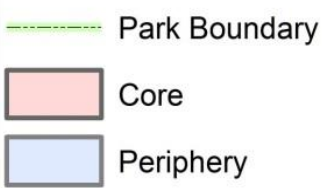
Core and Periphery

Rainy versus Non-Rainy Days



Rainy Days

Non-Rainy Days



Orthophoto and Base Data Source: City of Nanaimo

Region	Rainy		Non-Rainy	
	<i>n</i>	Area (ha)	<i>n</i>	Area (ha)
Core	15	13.2	224	18.8
Periphery	15	19.6	224	42.9

- Differences by weather (rainy vs. non-rainy)

UPCOMING TASKS

- **Software Rebuild**
 - New ArcGIS Pro combines 2D and 3D operations
 - Visual Basic for Application has been phased out and replaced by Visual Basic.NET
- **Refine feature collection procedures**
 - Use key informants and snowball sampling to develop list of important features
 - Refine list and collect data during pre-survey

UPCOMING TASKS

- **Survey Changes**
 - **Simplify Survey**
 - Change emotion model from Plutchik (1980) to Russell's core affect model (2003)
 - No abstract emotional terms
 - Displeasure-pleasure and deactivation-activation axes
 - **Consider Mobile Options**
 - Allow participants to take paper survey with them in park
 - Smartphone application

UPCOMING TASKS

- **Further Analysis Tools**
 - Qualitative Analysis of Comments
 - Clustering of surfaces generated based on their shape
 - Are there groups based on perceptions of the park?
 - Refine current tools
- **General Improvements to Software**
 - Use of catalogue of features
 - Ability to "drill down" to obtain information about features, source data
 - Production of place attachment surfaces while participant is present
 - Immediate feedback on shape, quality of results

UPCOMING TASKS

- **Going on the Road**
 - **Doing further studies**
 - Historical sites and districts
 - Neighborhoods (disadvantaged, historical, gentrifying)
 - Larger parks (city, regional, provincial, national)
 - Areas of contested resource use
 - Large land development projects
 - Contested boundaries
 - Important Secular and Religious Places etc.
 - Definition of geographical nomenclature
 - **Helps refine procedures and software**
- **Publish, Publish, Publish!**

CALL FOR COLLABORATORS

- I've gone about as far as I can by myself
- This is currently world-leading technology
 - Ahead of teams in US, Australia, but probably not forever
- I need a team to build this into a "real" research project
 - Externally funded
 - Multiple collaborators
 - Publications in different fields
- If you have ideas for research, are interested in collaboration, or want to use the software, let's talk
 - brad.maguire@viu.ca

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