Fall 2020

DES 3520-001 Design Product Studio 2, Tsoutsounakis

AXESS

E - B i k e s

Access, Protection, Transport, and Guidance Across Bears Ears

Cody Snow | Navi Guerra

Multi-Disciplinary Design, University of Utah

Partnership | BLM

TABLE OF CONTENTS

AXESS E-Bikes

01

RESEARCH

RESEARCH

RESEARCH

RESEARCH

RESEARCH

RESEARCH

Navi Guerra | Cody Snow

PARTNERSHIP | THE BUREAU OF LAND MANAGEMENT

"A primary objective of the BLM's travel and transportation management is to establish a long-term, sustainable, multi-modal travel network and transportation system that address the need for public, authorized, and administrative access to and across BLM managed lands and related waters."

[Bureau of Land Management Agency]

"The Bureau of Land Management, BLM, proposes to amend its off road-vehicle regulations to add a definition for electric bikes (e-bikes). E-bikes should be treated the same as non-motorized bicycles, expressly exempt those e-bikes from the definition of off-road vehicles. This proposed change would facilitate increased recreational opportunities for Americans, especially those with physical limitations, and would encourage the enjoyment of the lands and waters managed by the BLM"

[Bureau of Land Management Agency]

Research

Current Transportation 03

Visitors have a variety of different travel options when exploring monument lands. There are pros and cons to each travel method, affecting visitors, the land, management, or some combination of the three.

OHV's provide the fast transportation, however they harm the land, are heavily restricted, and are the most expensive form of transport.

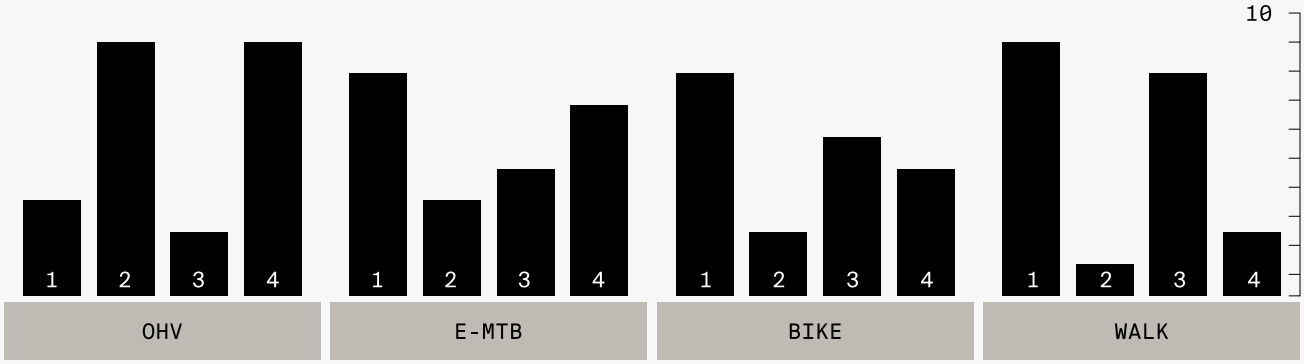
Bikes have less impact on the land, have more access, however can be expensive, provide slower transportation speeds, and are physically taxing.

E-bikes offer benefits similar to OHVs like fast and fun transport, while limiting damage to the environment and providing wider access.

Walking causes the least damage to the environment and grants the widest access, however, is the slowest form of transport and the most physically taxing.

This graph shows how the four primary travel methods, OHVs, E-MTBs, Bikes, and Walking compare to each other via accessibility, environment effects, rules and regulations, and the average cost.

1. Environmental Impacts
2. Inaccessibility
3. Cost to Users
4. User Limitations



Navi Guerra | Cody Snow

OHV

01 Erosion:

Soil compacting, surface changes, rilling, gullying, and loss of vegetation increase rates of erosion.

02 Soil Compacting:

Repeated forces compact soil harming root systems and expediting erosion.

03 Dust Storm:

OHV travel, especially at high speeds, kicks dust into the air and churns soil increasing likely-hood of dust storms.

04 Wildlife Disturbance:

Wildlife responds to OHV traffic with stress, leading to displacement, mortality and reproductive failure.

05 Pollution:

Vehicles emit dust and carbon-dioxide while also risking oil and chemical leaks.

06 Plant Disruption:

Native vegetation can be trampled and destroyed, micro-habitats change species composition, and travel offers chance for spread of weeds and invasive species.

Navi Guerra | Cody Snow

Management:

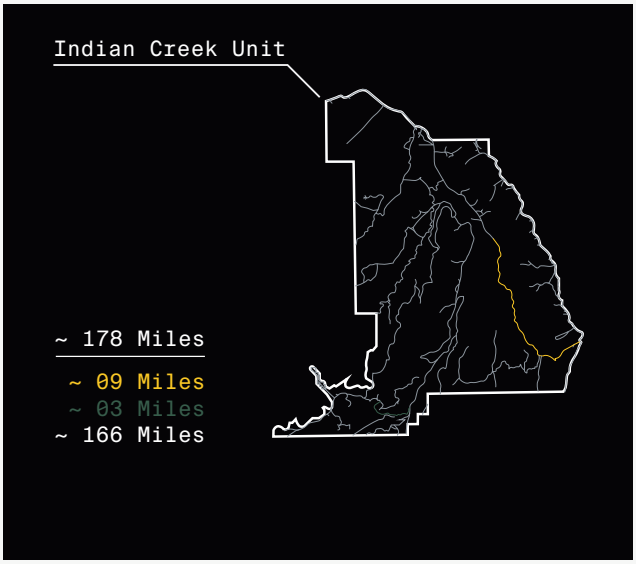
The Monticello Field Office of the BLM manages nearly 1.8 million surface acres of land. Visitors might choose to participate in hiking, biking, and the use of OHV's on BLM lands. That is not to mention the other management responsibilities of the BLM including grazing, maintenance, and environmental study.

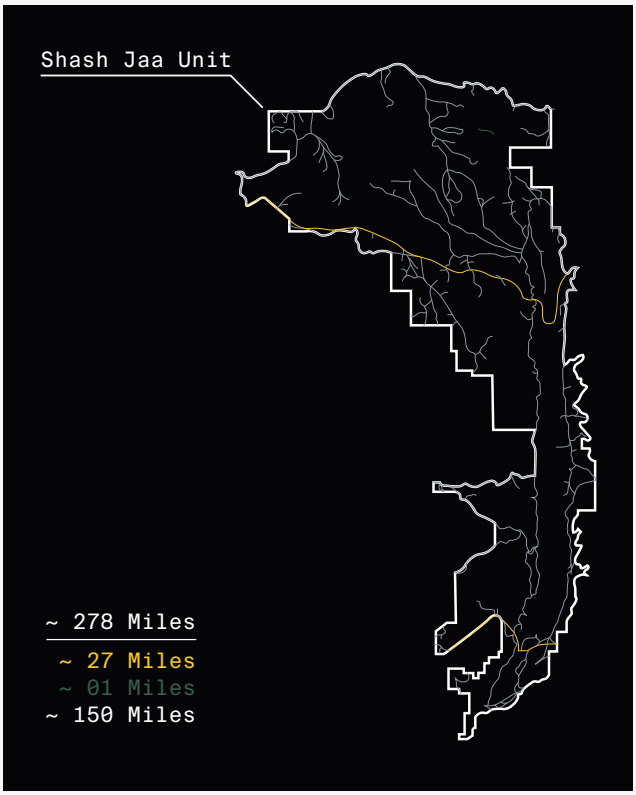
Designated Routes:

Within both the Sash Jaa and the Indian Creek units of Bears Ears National Monument there are number of designated travel routes. These routes include primitive roads, ATV & dirt bike trails, and larger main roads. Combined, there are roughly 465 miles of such roads.

The Challenge:

With such a vast amount of land and wide range of responsibilities, it is impossible to completely manage visitor activity on designated routes alone. Furthermore, without such management, many visitors, either with or without intention, veer off designated paths, making the challenge of tracking and controlling activity even greater.



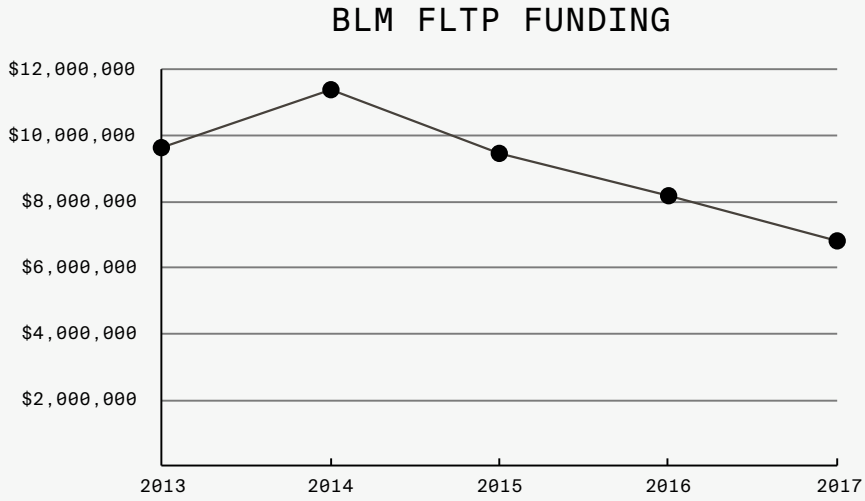


Legend
- Primitive Road
- Primary Road
- ATV+Dirt Bike Trail

Navi Guerra | Cody Snow

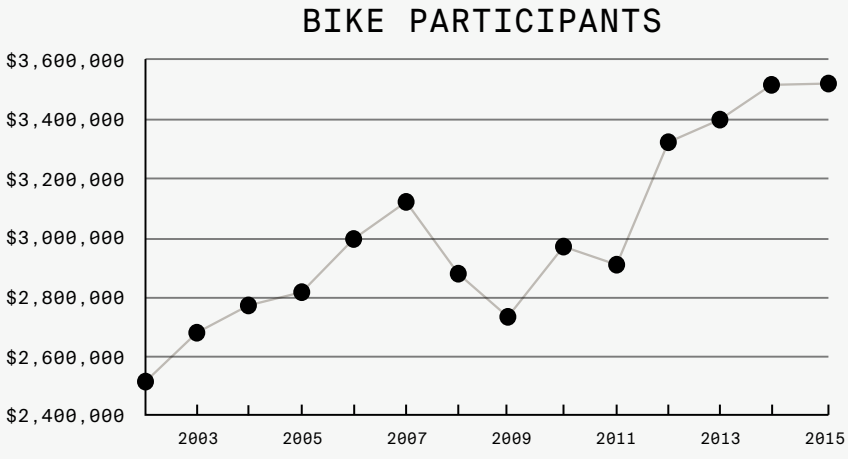
Graph 1:

The BLM Federal Lands Transportation Program Funding has been steadily decreasing since 2013



Graph 2:

Bike participants on BLM lands have been on a steady incline since 2002. This incline is likely to continue with the rising popularity of e-Bikes giving access to more people.



Significance:

With the transportation funding going down and bike usage on BLM land going up, the opportunity to leverage increased bike traffic for funding reveals itself.

Navi Guerra | Cody Snow

Multiple Routes:

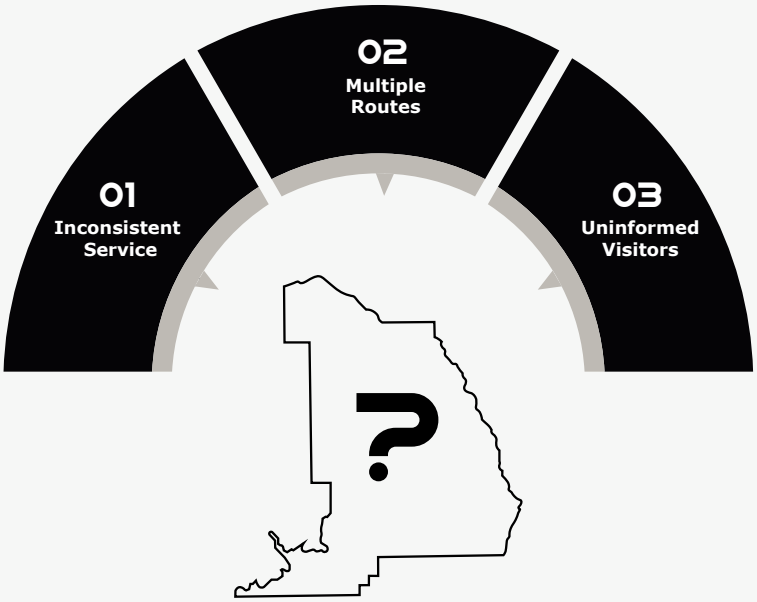
Either by intention or accident users commonly travel off trail or along unofficial, user created trails. The resulting spiderweb poses challenges for enforcement as well risks damage to both the environment and cultural sites within Bears Ears.

Inconsistent Service:

When users are attempting to navigate on BLM lands there is no guarantee that they will have cell phone service, which to many, eliminates their means of navigating,

Uninformed Visitors:

Due to trail proliferation, and the scale of land managed, there will not be a trail marking or sign on every road, and visitors are not guaranteed to see or stop at an information center during their visit. Furthermore, many visitors do not understand or consider the cultural and ecological significance of the land they are standing on.



OHVs:

OHVs are a common form of transport recreation on BLM land, however, they harm the environment and can be difficult to manage across large areas.

Rules:

Regulations imposed on each form transport recreation determines how and where they can be used safely, limiting access to some visitors.

Current Travel:

Alongside OHVs, there are other forms of transport recreation that offer different benefits however, each is accompanied by their own undesired impacts.

Navigation:

Trail proliferation has been cited as an issue across public lands, either by intention or due to a lack of information, visitors commonly veer off trail.

Management:

The scale of land and trail systems that needs to be managed coupled with a lack of management recourses makes enforcement near impossible.

To help visitors of all ability's access the natural and cultural landscapes within Bears Ears by providing a platform for the rental of site tailored e-Bikes. Such bikes will provide transport and education to visitors, funding and control to management, as well as protection to the land.

OPPORTUNITY

OPPORTUNITY

OPPORTUNITY

OPPORTUNITY

OPPORTUNITY

OPPORTUNITY

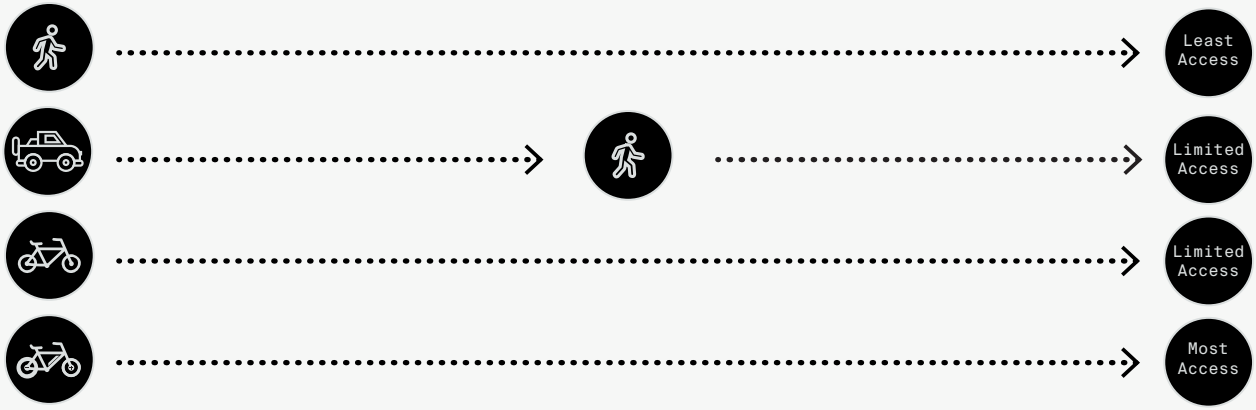
Navi Guerra | Cody Snow

PARTNERSHIP | THE BUREAU OF LAND MANAGEMENT

“The integration of a small electric motor onto bicycles has reduced the physical demand required to operate an e-bike and, in turn, has increased the public's access to recreational opportunities. Including for people with limitations stemming from age, illness disability or fitness, and in more challenging environments, such as high altitudes or mountainous terrain.”

General Access Path

Specific Transport Methods



Walking is the most basic form of transport, however, in the desert heat of Utah over long distances, such activity will prove strenuous and time consuming.

Cars and OHV’s of course offer access without physical exertion, however their access is limited, meaning many locations will require getting out to walk, or will remain inaccessible.

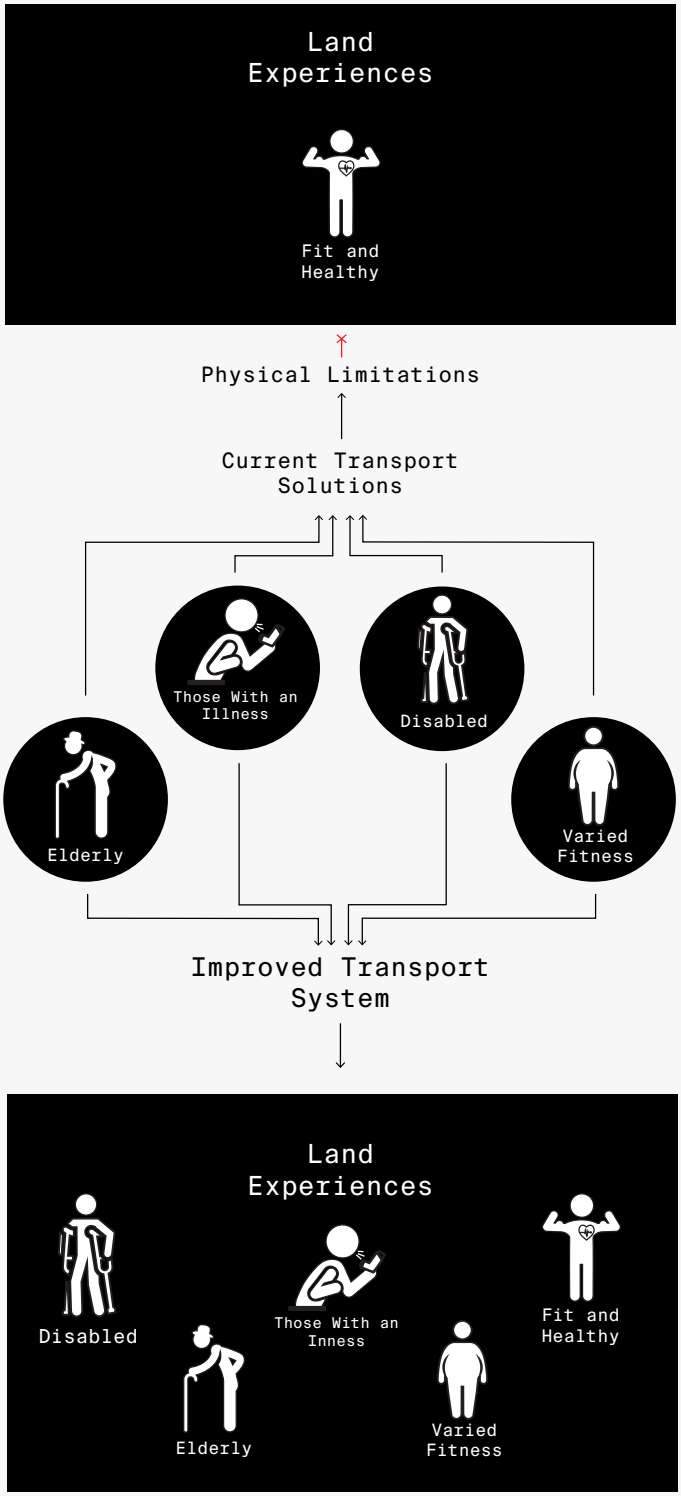
Biking offers many of the same benefits of walking, however requires you to have and bring your own bike and although will offer greater reach than walking, will still prove strenuous for many.

E-Bikes that offer pedal assist give the widest range of access while also relieving physical strain, giving access to those who would struggle otherwise.

Upon arriving at Bears Ears National Monument, visitors need transport to their desired recreation sites. Whether they are hiking to a cultural site, simply taking in the view, or enjoying other recreation on BLM land, they require transport. There are of course a variety of reasons people chose the various modes of transport they do, however for some, the choice of transport method is not simply one of preference.

Depending on your fitness levels, struggles with disease or illness, disabilities, or other physical limitations, you may not be able to partake in outdoor activities as those around you. Walking or biking to a desired destination may be physically out of reach for many, forcing them to chose transport methods such as OHVs. However, OHVs and similar transport methods are often accompanied by restricted access, thereby limiting a users potential destination choices.

Pedal Assist e-Bikes bridge the gap between motorized and human powered travel, thus benefiting from both increased access and motor assisted travel. By closing the gap in access between those that are able bodied and those that are not, e-Bikes could give better access to a wider user group throughout bears ears.



Opportunity

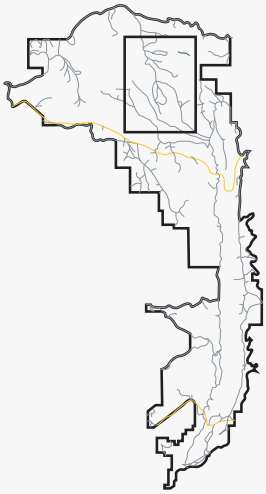
Reducing Traffic

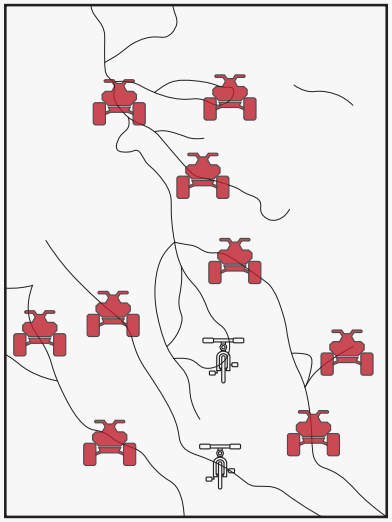
12

Traveling across bears ears is primarily done over primitive roads, however shorter expanses of primary roads and OHV trails also exist within Bears Ears. OHVs, including personal vehicles, are a common choice of travel for such a destination given there speed, carrying capacity, off road capabilities, and fun of use. However, such vehicles also offer a variety of draw backs including disruptive noise, pollution, and harmful impacts to the land.

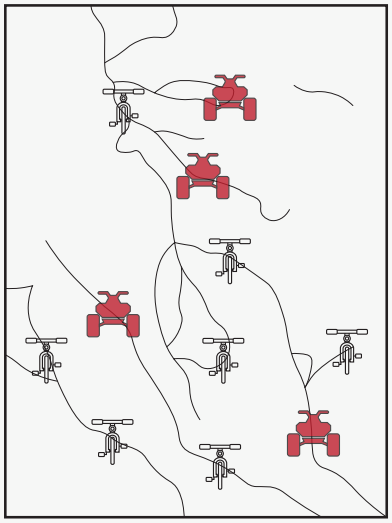
E-bikes offer many of the same benefits of travel that OHVs do, and can be made to accommodate cargo in many of the same ways. By offering site tailored e-Bike travel, some users may opt to take a rental bike to their desired destination rather than go by OHV travel, thus reducing the number of OHVs traveling across Bears Ears and in turn reducing the overall impact of OHVs on the land, environment, and other visitors.

Shash Jaa Unit





Before offering supplemental Transport



After offering supplemental Transport

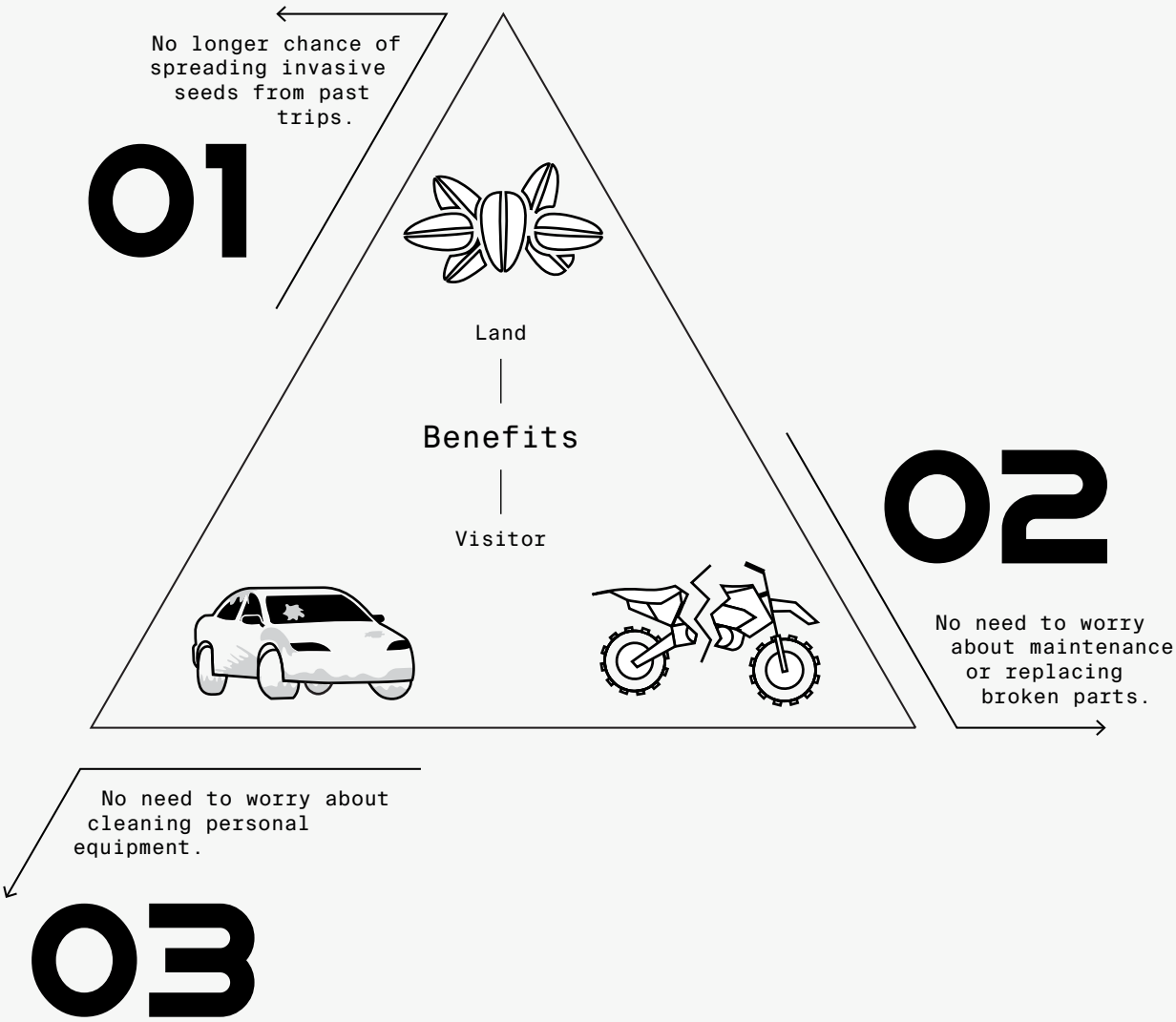
Partnership | The Bureau of Land Management

Navi Guerra | Cody Snow

By creating a localized transport system, many of the variables and unknowns associated with visitor recreation can be mitigated while simultaneously benefiting all involved parties.

Because visitors won't have to bring and use their own gear, they save the hassle of cleaning up after the trip is over. Furthermore, they need not worry about broken parts and maintenance should they have problems or an accident during their trip.

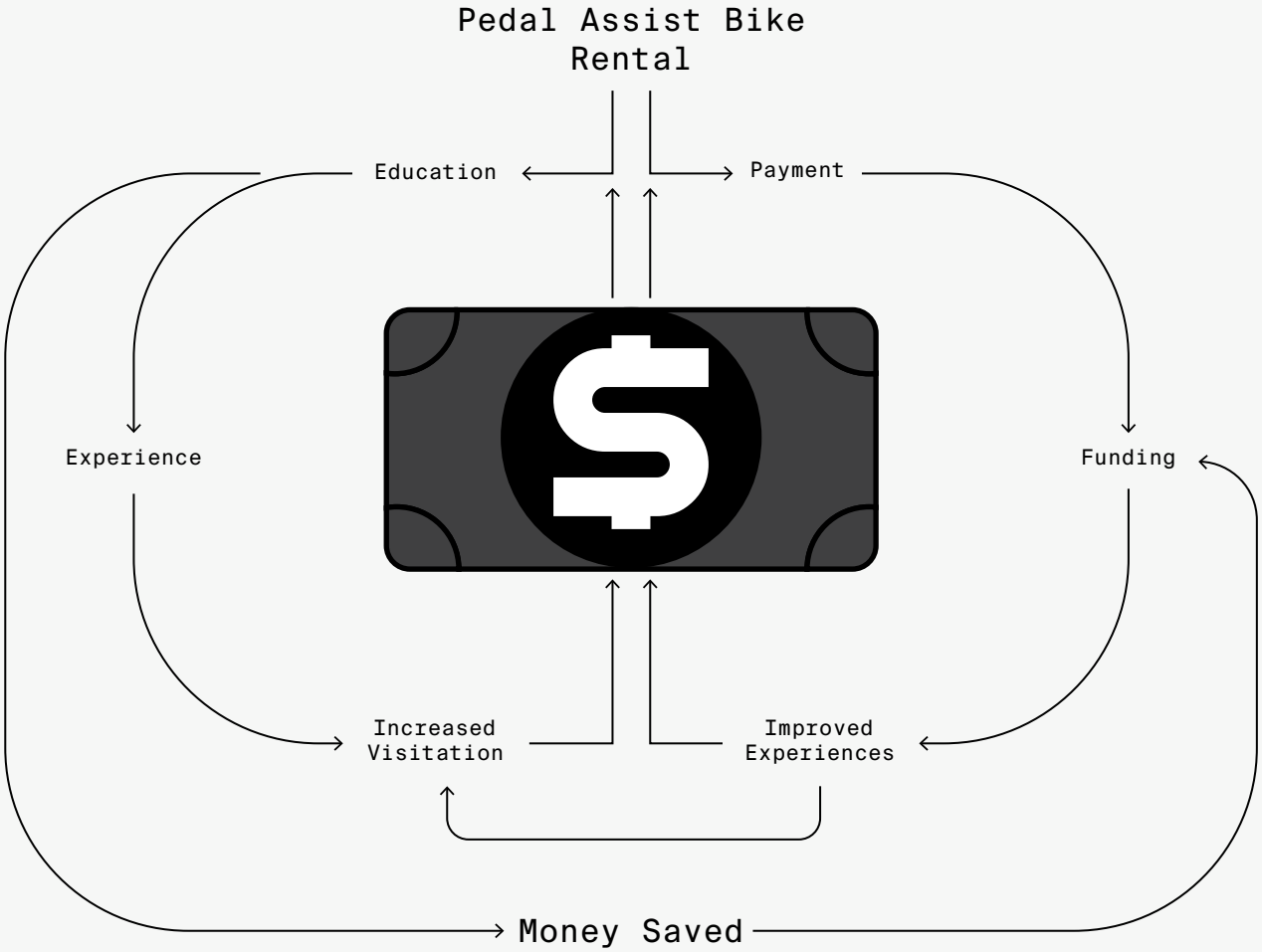
Visitor owned cars, OHV's, and bikes are likely used in a variety of locations introducing the possibility of invasive species hitching a ride from one habitat to another. A localized transport system eliminates this threat for the bikes are repeatedly used on the same land.



The creation of on site rental transportation also brings with it the opportunity for management to benefit economically. Through visitors paying for a rental bike and an experience within the park, funding is generated for the B.L.M. Such funding could then be used to benefit the land through maintenance and protection. Through improved experiences, visitors are more likely to return and spread the word of the experience they had. This will lead to more rentals which in turn generates more funding, thus repeating the cycle.

Furthermore, the process of renting a bike gives an opportunity for interaction with visitors. Through interaction, visitors could receive education about monument etiquette and trail systems, allowing them to have both a fun and respectful experience within the monument. Having the correct experience means visitors are more likely to enjoy themselves and avoid frustrations, inviting them to return and spread the word of their experience.

Additionally, visitors are less likely to damage the land or cultural sites by being more informed, thus saving the money that would otherwise be spent on enforcement and maintenance.

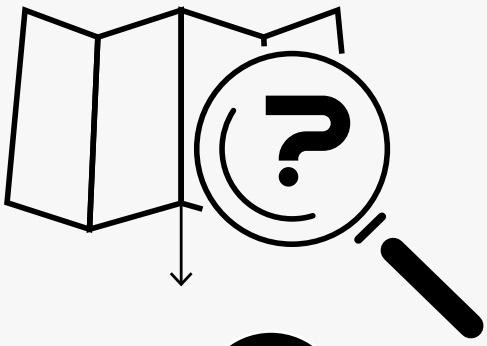


Navi Guerra | Cody Snow

Managing all the visitors within the land and trails that the BLM governs is an impossible task, however it is possible to control and monitor at least a portion of the land's visitors. Through a site managed transportation system, GPS could be integrated into vehicles and management tools, allowing staff to keep an eye on a portion of the parks visitors with limited staff and tools.

Furthermore, implementing such a tracking system would allow management to deal with those disobeying land rules and etiquette. This could lead to fines, generating revenue for the park, or for better understanding of what causes and allows for misbehavior within the monument.

Additionally, looking at implementing a park regulated transport system reveals an opportunity to gain insight from visitors. Through interaction either with the vehicle, staff, information sites, or digital tools available on mobile devices, visitors can provide feedback and locations of problems on the land. Specific sites could be marked and later dealt with by management.

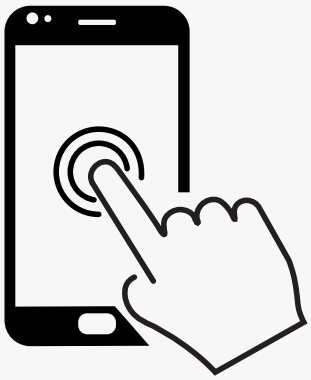


Visitor Monitoring

By controlling the means of transport management can implement their own tracking methods through GPS, allowing them to track and monitor visitors within the park.

User Interaction

By giving visitors a means to interact with land management, it is possible for user experiences to benefit the land and help management.



Navi Guerra | Cody Snow

AXESS E-Bikes

16

Navi Gueria | Cody Snow

PARTNERSHIP | THE BUREAU OF LAND MANAGEMENT

System Diagram

The System:

To create a platform for the rental of site tailored e-Bikes a system is created between the bike, accompanying mobile app, and physical rental locations to provide users with the desired experience while benefiting management, the land itself, and accessibility for all visitors.

The App

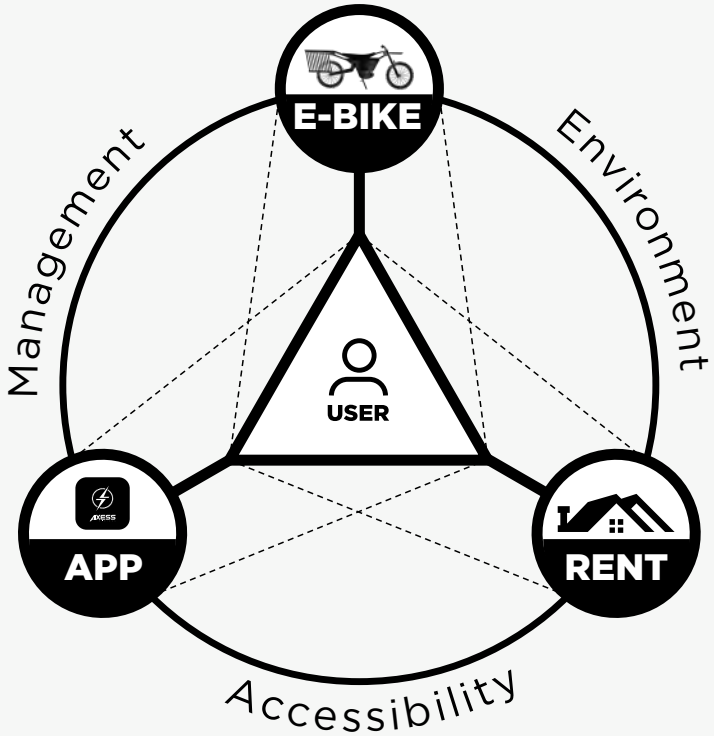
The app facilitates benefits offered by the bike as well as makes navigating the various features easier than on the bike itself. The app also gives additional functionality to users by providing tailored trips, downloadable content, and increased control of bike settings.

The Bike:

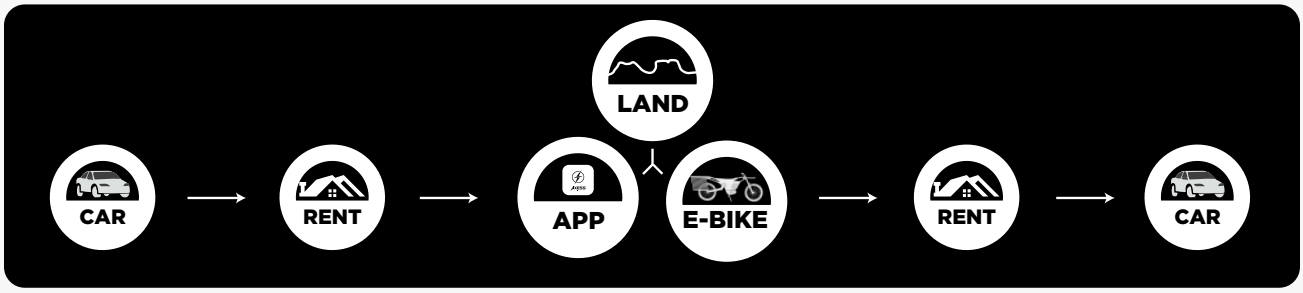
The bike benefits management by providing tracking information on users and allowing users to report vandalism and site damage. Furthermore the bike serves as an alternative experience to OHV travel with fewer drawbacks to other users as well as the land.

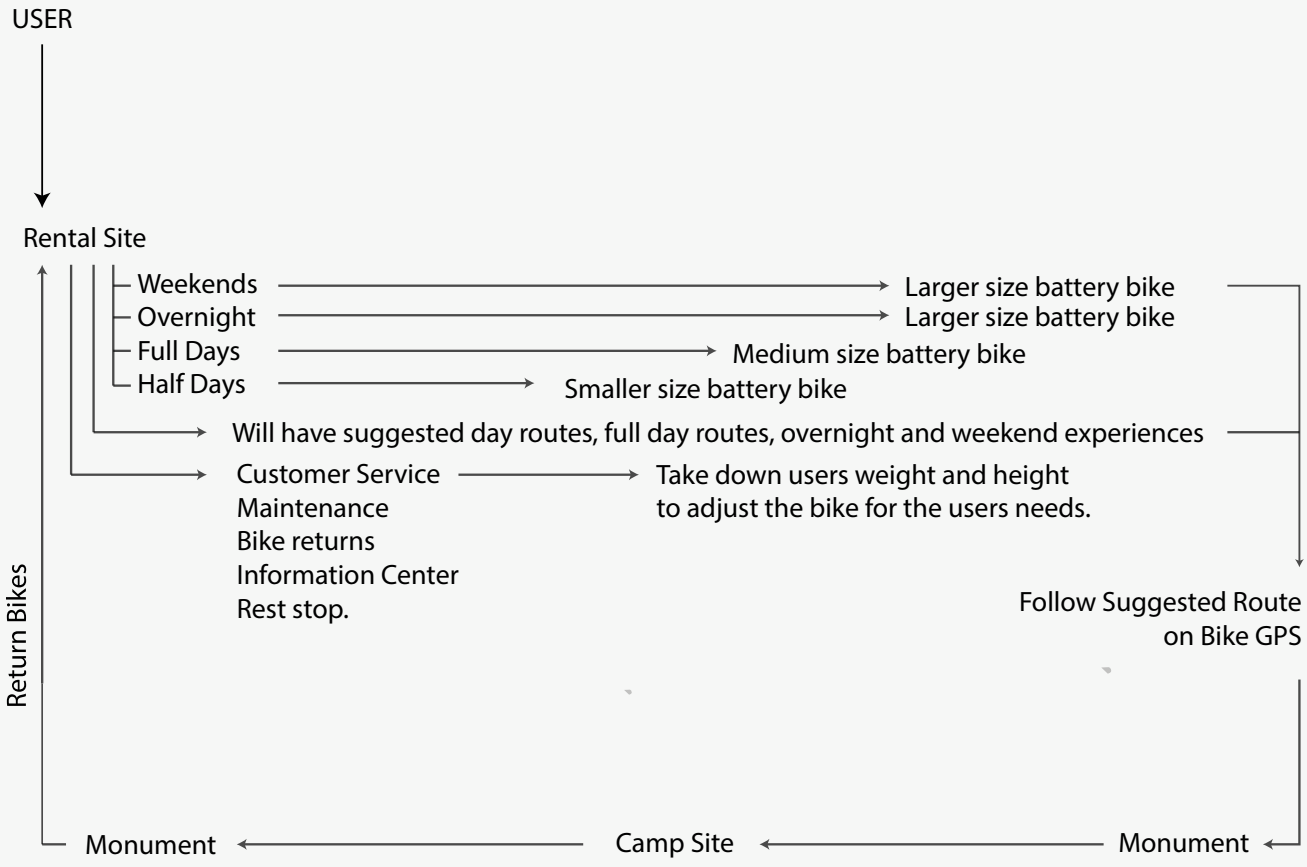
The Rental Site

The rental sites benefit the land by providing users important information for having a respectful visit within the monument. Furthermore, the site gives users a place to leave their cars or OHVs behind before entering the monument.

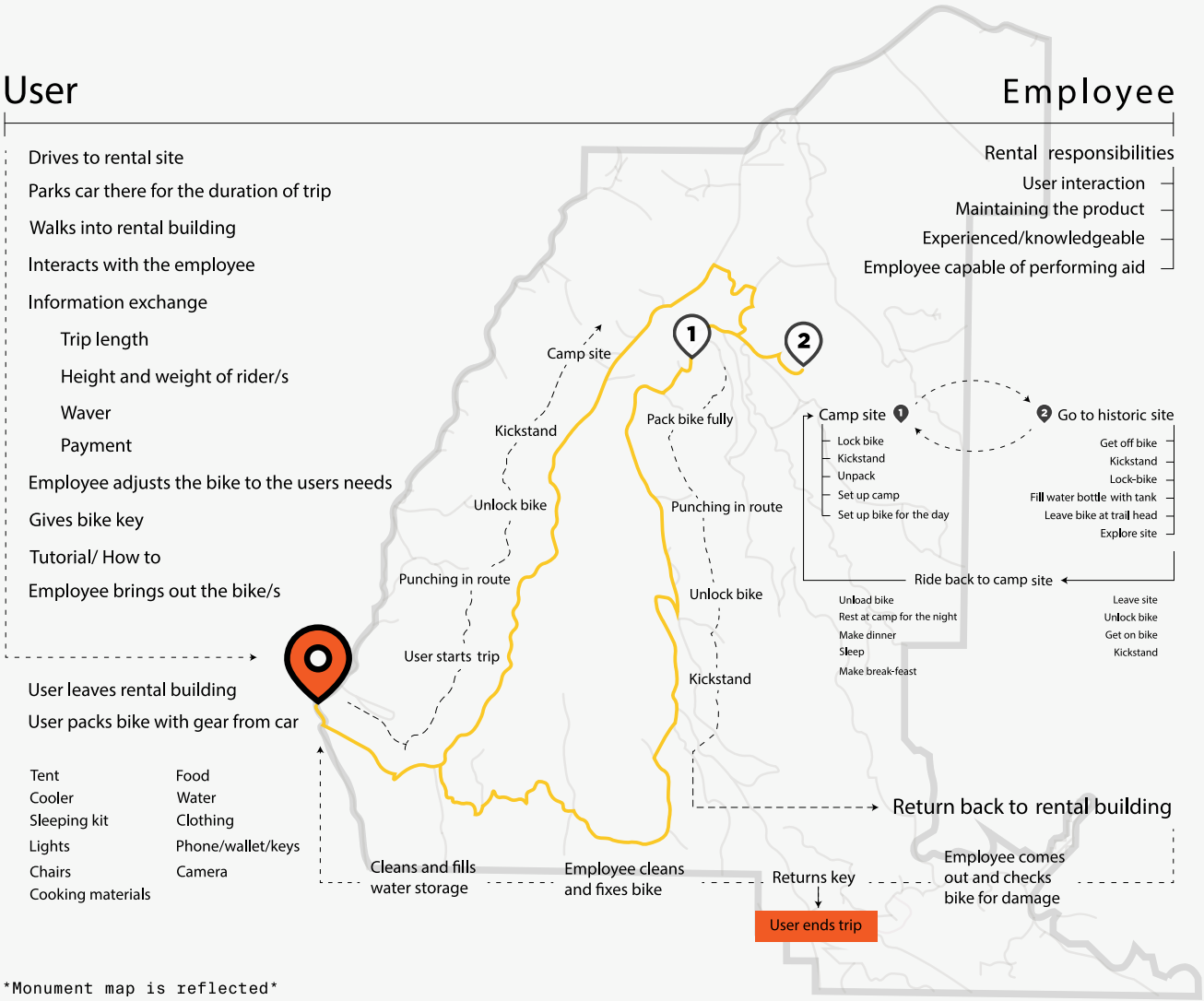


We began our process of understanding the user experience by creating a general, over-arching journey map of our system outlining the various scenarios and settings our users will be working within. From this journey map we decided to focus our design specifically on the user journey between full day and overnight experiences within Bears Ears. From here we could then build more detailed journey maps allowing us to better focus our design response.



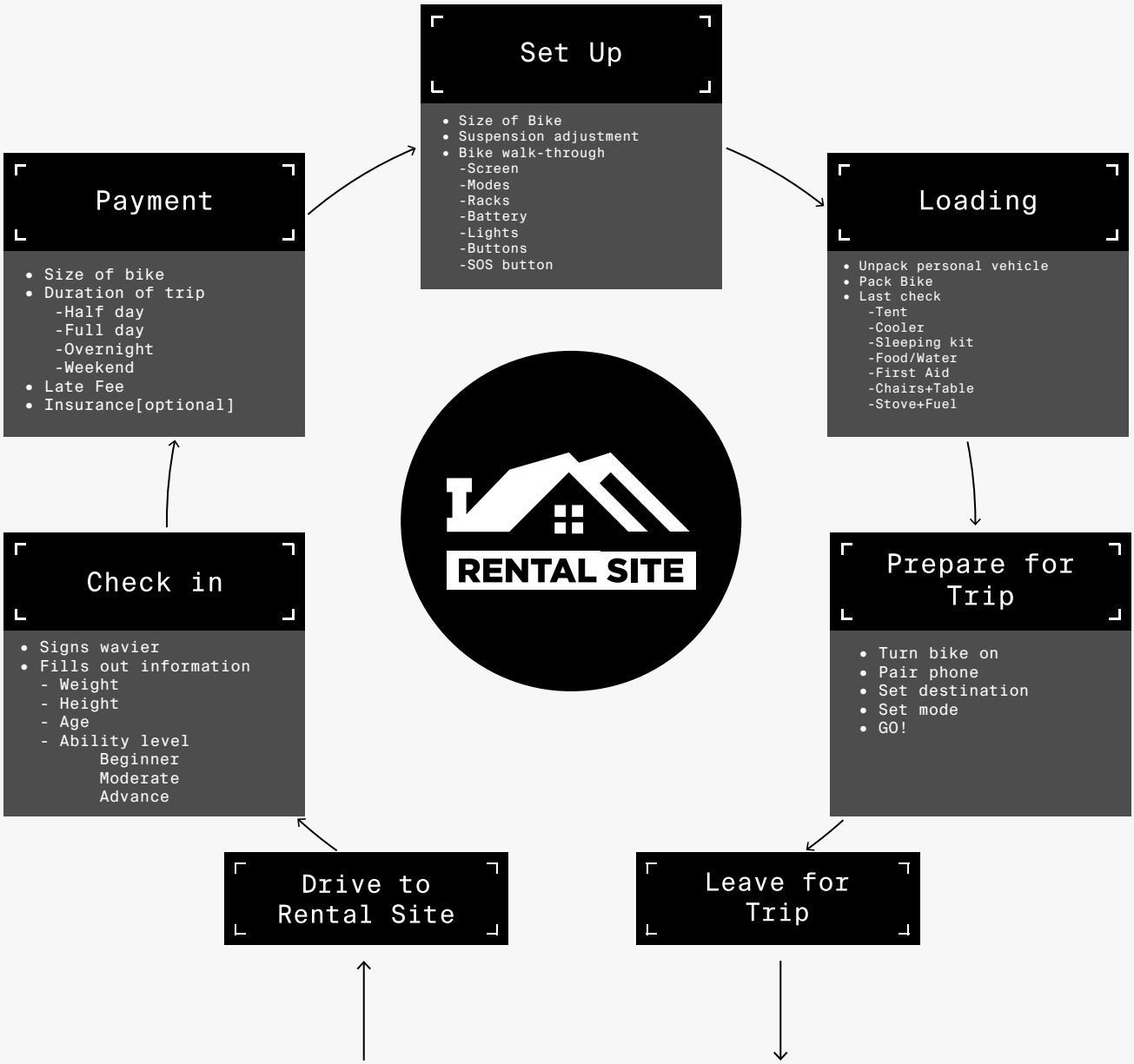


Here we have created a potential journey map for users that are planning on taking an overnight trip. This map takes you through step by step how a user would interact with our system design from start to finish. Including the interaction between the user and employee, the various gear items a user could bring for an overnight trip, and the procedure of operating the Axcess E-bike throughout the land in different scenarios such as camp sites, historical sites, and returning the E-bike.

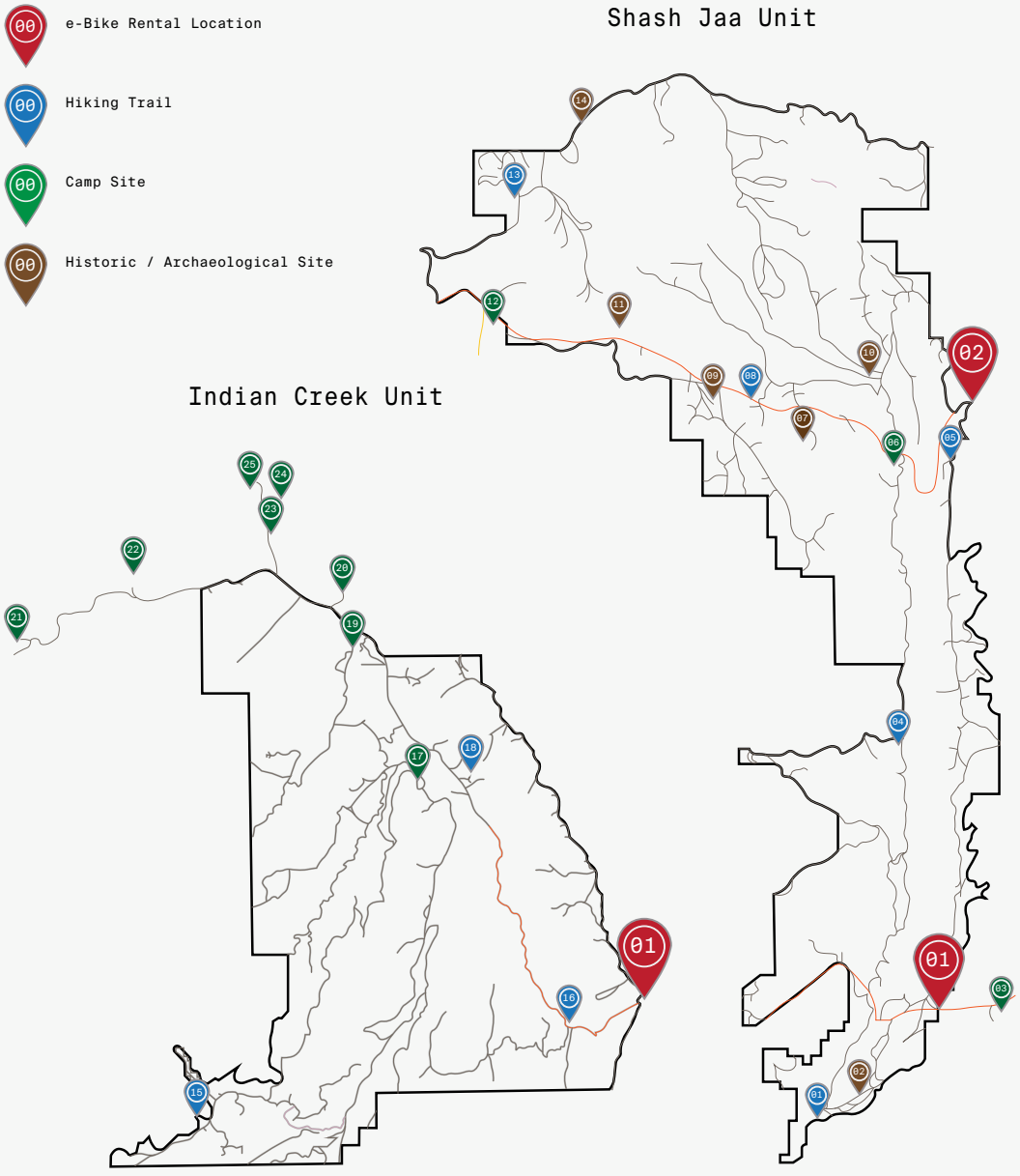


Monument map is reflected

This diagram represents the user interactions with the rental site aspect of our system design. It takes the user through the seven main steps which are drive to the rental site, check in, payment, set up, loading, preparation for the trip and lastly user leaves to being there trip. This map, as well as those proceeding it, gave us a better picture of user interaction within our system, allowing us to account for their actions and needs in our final design response.



In order to tailor our Bike and overall platform to the landscape we mapped out all the primary, primitive, and OHV roads within Bears Ears. These would be the roads traveled on our bikes and in doing so we were also able to map all the historic sites, camp sites, and hiking trails within Bears Ears. Having looked at these maps we then added our own proposed rental sites at the intersections of the primary roads and monument boarders as we anticipated these would be the most likely spots users would travel across on a journey into Bears Ears.



Having mapped out our Rental Sites, the roads, and the attractions within the monument, we were then able to map distances from our proposed rental sites to those attractions within the monuments and account for the types of roads that would be traveled in order to access those destinations. This information informed the battery size, cargo requirements, and other factors that would then influence the final bike, and overall platform design.

Shash Jaa Unit: Distances to Sites of Interest from Rental Sites

- 01 San Juan Hill: 5.87 miles from Proposed Rental Site
- 02 River House: 4.73 miles from Proposed Rental Site
- 03 Sand Island Recreation Site: 2.2 miles from Proposed Rental Site
- 04 Lower Fish Creek: 12.1 miles from Proposed Rental Site
- 05 Butler Wash Trail: 2.39 miles from Proposed Rental Site
- 06 Comb Wash: 5.46 miles from Proposed Rental Site
- 07 Cave Towers: 10.2 miles from Proposed Rental Site
- 08 Mule Canyon Trail: 10.3 miles from Proposed Rental Site
- 09 Mule Canyon Kiva: 13 miles from Proposed Rental Site
- 10 Arch Canyon: 8.13 miles from Proposed Rental Site
- 11 Salvation Knoll: 14.87 miles from Proposed Rental Site
- 12 Hole in the Rock: 19 miles from Proposed Rental Site
- 13 Bears Ears Buttes: 27 miles from Proposed Rental Site
- 14 Arch Canyon Overlook: 23.87 miles from Proposed Rental Site

Average Distance: 11.37 Miles
Min: 2.2 Miles
Max: 27 Miles

Indian Creek: Distances to Sites of Interest from Rental Sites

- 15 Salt Creek: Not Accessible from Proposed Rental Site
- 16 News Paper Rock Panel: 2.6 miles from Proposed Rental Site
- 17 Bridger Jack Mesa: 18.33 miles from Proposed Rental Site
- 18 Indian Creek: 11.6 miles from Proposed Rental Site
- 19 Superbowl: 17.6 miles from Proposed Rental Site
- 20 Creek Pasture: 18.4 miles from Proposed Rental Site
- 21 Squaw Patch: 28.27 miles from Proposed Rental Site
- 22 Needles Outpost: 23.8 miles from Proposed Rental Site
- 23 Hamburger Rock: 20.73 miles from Proposed Rental Site
- 24 Hamburger?: 23.2 miles from Proposed Rental Site
- 25 Indian Creek Falls: 22.33 miles from Proposed Rental Site

Average Distance: 16.99 Miles
Min: 2.6 Miles
Max: 28.27 Miles

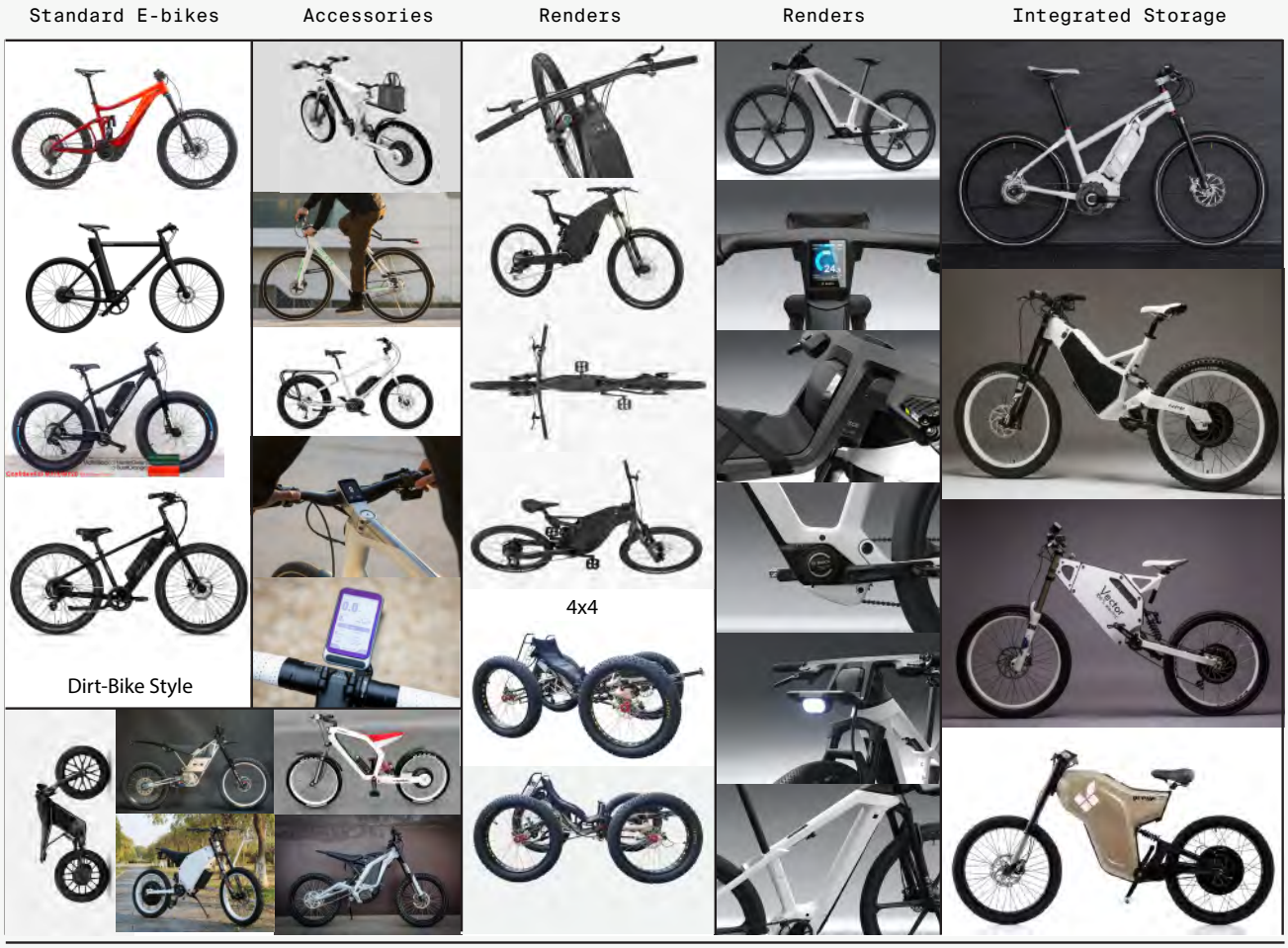
PROCESS
PROCESS
PROCESS
PROCESS
PROCESS
PROCESS

Navi Gueria | Cody Snow

PARTNERSHIP | THE BUREAU OF LAND MANAGEMENT

Before beginning our own design process to discover a possible form for a site tailored e-Bike within Bears Ears, we looked at the current offerings for both commercial and experimental e-Bikes. We did not, however, limit our search to just e-Bikes, we additionally looked at motorized three, and four wheel transportations devices in both medical and recreational fields.

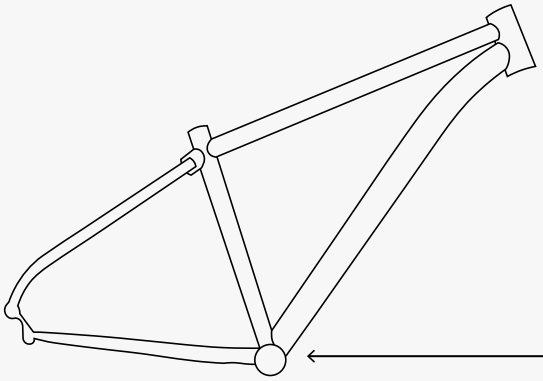
After surveying the available options we incorporated features like front and rear lights, basket storage, moto-inspired seats, and more from current e-Bike models. We then considered features that would be complimentary to the environmental and situational considerations of Bears Ears. We then began experimenting with various possible forms for the bike that would accept those features we desired to include.



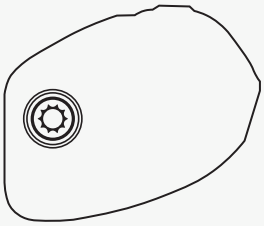
In order to explore the endless variety of forms the bike might take on, we first needed a starting point. We decided the easiest place to start would be with a basic, hard-tail, fat-bike frame. We decided to start with a hard-tail so we would mot have to worry about the rear linkages to incorporate suspension right off the bat, and we decided to use a fat bike frame for the landscapes of southern Utah are often sandy, requiring wider and softer tires to stay afloat.

To make our transportation electronically assisted and thus increase accessibility to a wider user group, we started with a Bosch Cargo line motor. Bosch was chosen for they are leaders in the making of motors and batteries for pedal assist bikes, and the cargo rating would be needed to transport user gear to and from the rental site and monument attractions.

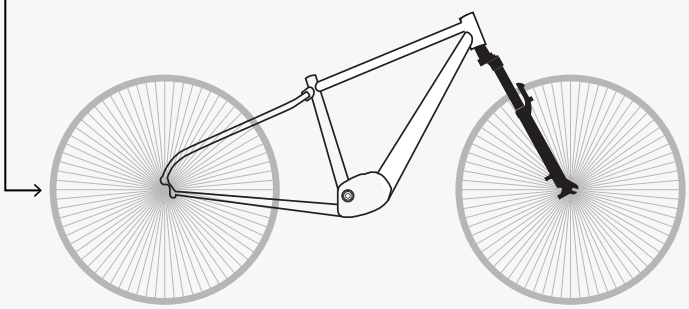
Hard Tail Fat Bike Frame



Bosch Cargo Line Motor



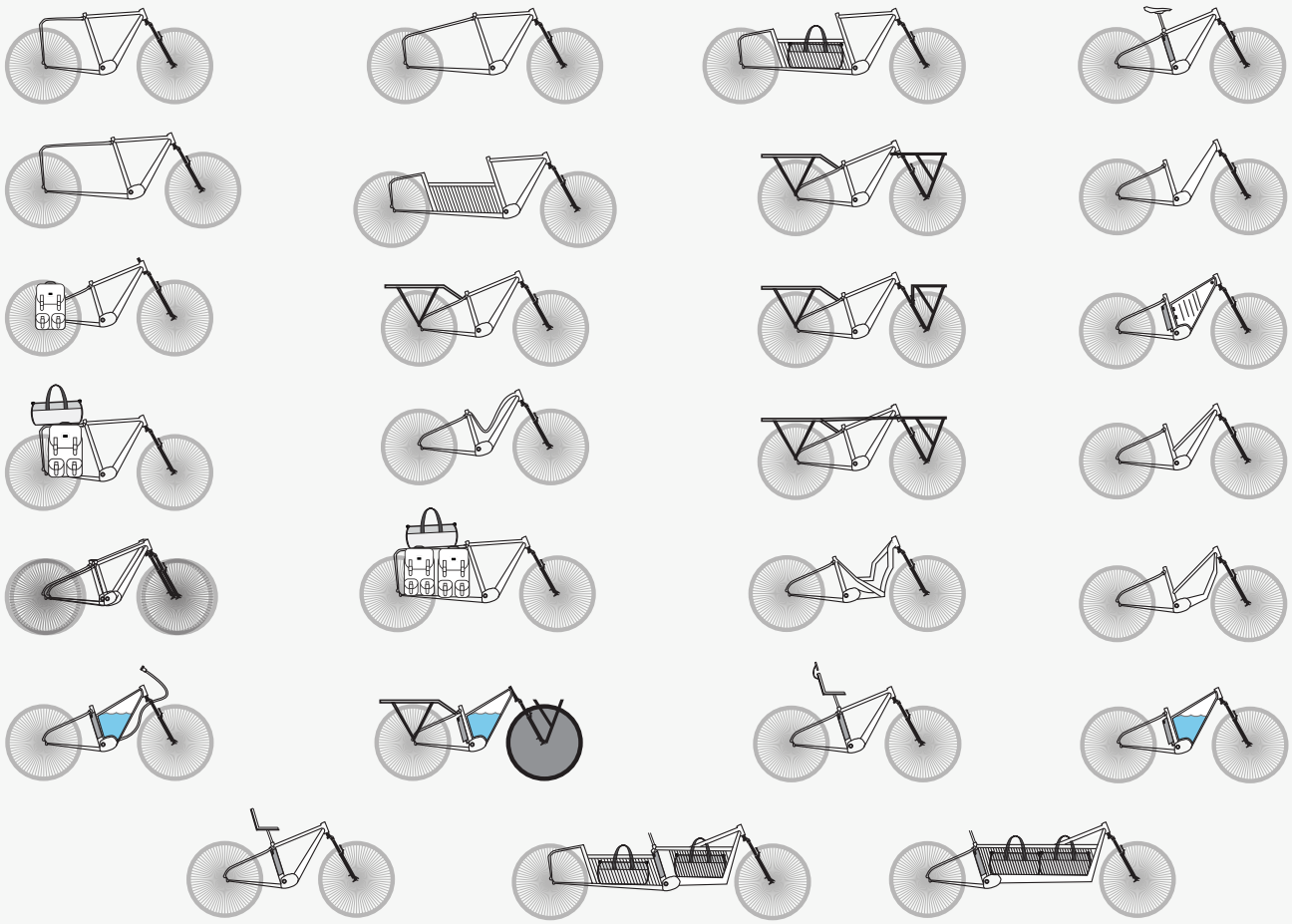
Starting Bike Form



In order to iterate on our starting bike, we considered all possible features that could facilitate a site tailored experience within Bears Ears. We determined the bike would require a significant amount of cargo storage so that users can carry gear two and from their vehicle when entering and exiting the monument. We determined we would need to accommodate water either on the bike or afford space that users could attach their own water carrying devices. We also wanted to incorporate GPS tracking and on bike navigation so that our bike would not contribute to off trail damage. We of course also had to consider more basic features such as making the bike easy for all users to get on and ride, the type of suspension the bike would use, and more.

After considering all our parameters our next step was to consider all possible shapes and forms, leaving no options on the table.

Example Sketches



In-Frame Storage

We began physical testing by building a cardboard visualizer to make a trail bike appear as though it had integrated storage. Having integrated storage built into the frame will help save space and improve efficiency. We could use this storage for various items or make it into a water storage. Using this space for water storage presents a number of challenges, including a barrier to germs, and concern that sloshing water will affect the rider's experience.

We needed to test the effects of water slosh when riding, and to do so we strapped a 4 liter bladder to a hard-tail mountain bike, and rode around. We noticed the water's movement most on hard braking and turning, and needed a solution if we were to continue exploring water implementation. We began looking at how truckers transport large liquid volumes, and noted they separate their storage containers with barriers that slow the slosh of water, minimizing its impact on ride quality. In the end, water storage was not incorporated into the final design and the space was allocated to more important features.

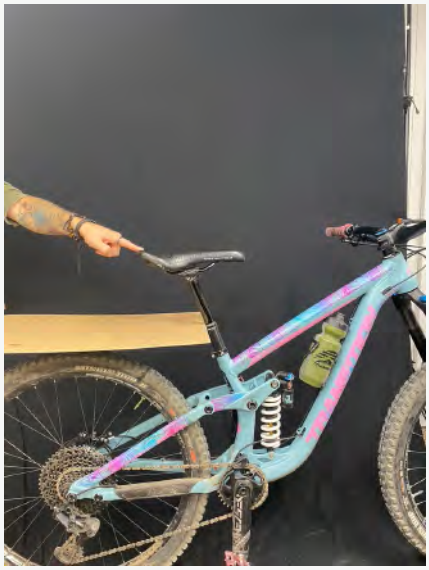
Frame Storage Visualization

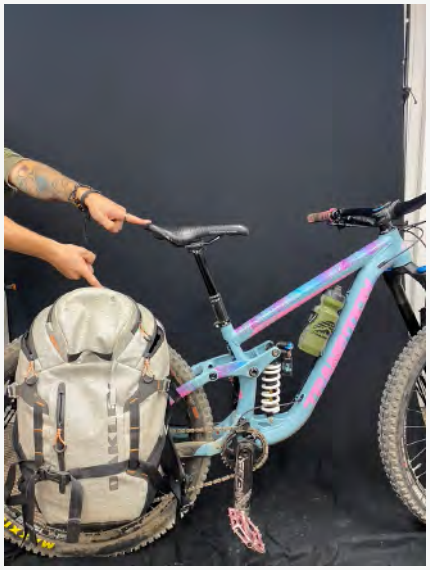
Slosh Testing

Slosh Solutions

We of course knew we would need additional storage on the bike, whether or not we decided to incorporate storage within the bike frame itself. Users attempting full day and overnight trips will likely have multiple bags of various sizes and materials they will need to attach to the bike for the duration of their ride. Using a Transition Patrol mountain bike for reference, we noted that a rack could be added over the rear wheel, in turn meaning one might be placed over the front wheel as well. These spots were the most obvious choices for larger bag storage on “standard” bike designs. However, we also noted that it might be possible to add bags to either side of the wheels increasing the number of bags that could be carried on any one bike.

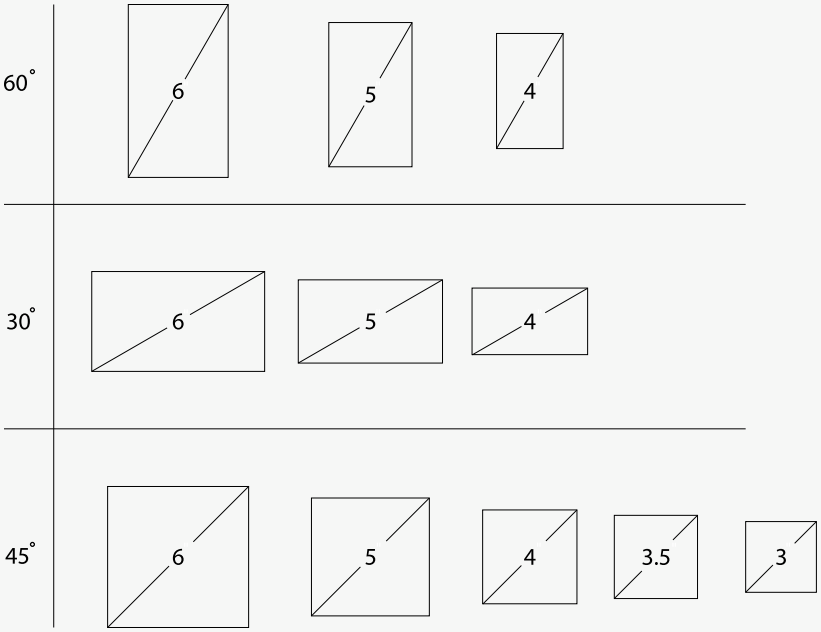
Primary On Bike Storage Locations

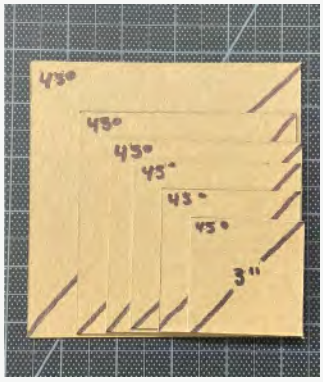




In order to efficiently and effectively incorporate a screen into our bike design we first desired to determine the size and placement of our bike screen. We began by surveying existing on-bike displays and other small navigation tools. We then sketched out a range of sizes and orientations for our screen, before cutting them out of chipboard to get a more real 3D sense of their scale. We discovered that the screen range should be between 3 inches as the minimum size and 6 inches as the maximum size. The four different positions we tested were the top tube, the stem, on top of the stem and on the handle bars. The 3 different orientations we went with were 45 , 30 and 60 degree rectangles.

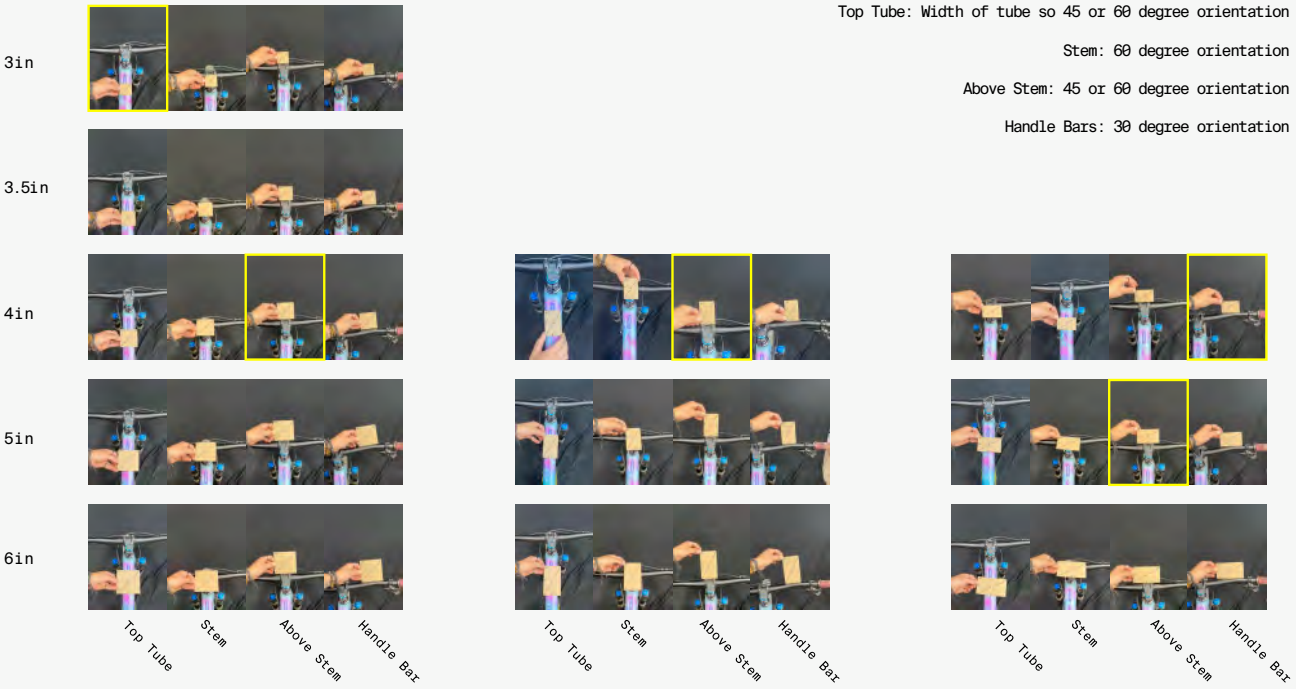
On-Bike Display Size Testing





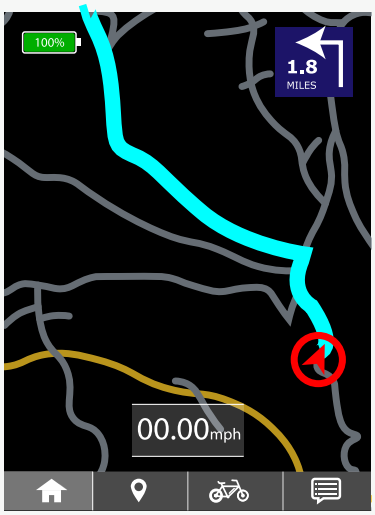
Through the trail and error of trying all the variations in sizing and position we came to a conclusion. We decided that the location of the screen directly determines the orientation of the screen. From this decision we were able to pick out some of our favorite options to move forward with and highlighted those position-size combinations in yellow. Certain positions warranted using smaller screens while other positions demanded particular orientations or positions. It became clear that there were multiple viable solutions for screen positioning and we decided that our final decision would need to be informed by the bike form we would later land on.

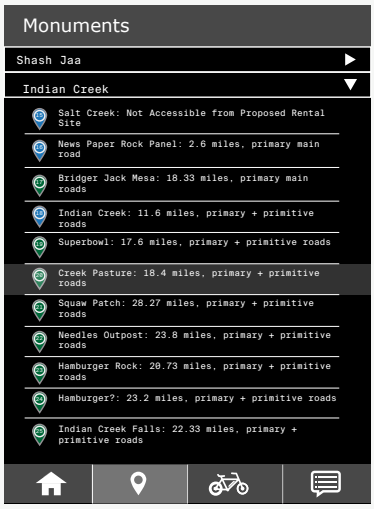
On-Bike Display Position Testing

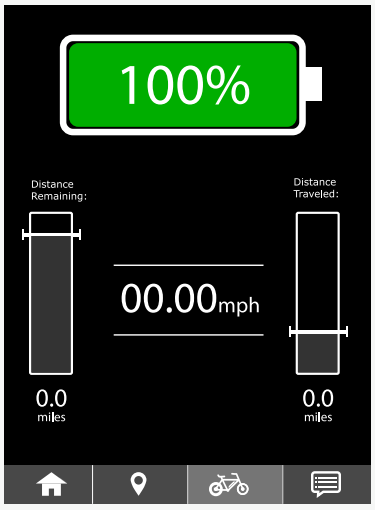


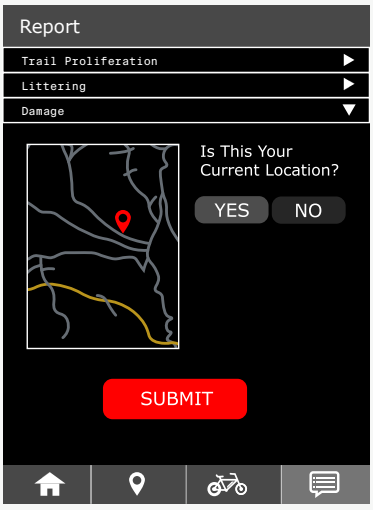
After determining the potential size and placements of our screen, we decided to start prototyping the user interface as well, in hopes it would additionally inform our design process. The initial prototype suffered in a variety of ways including lacking necessary functions, being to dark for daytime use, and poor visual communication. However, creating this prototype gave us a better sense of what features would need to be included in the final screen application and how the user might interact with those features.

Initial Screen Prototypes





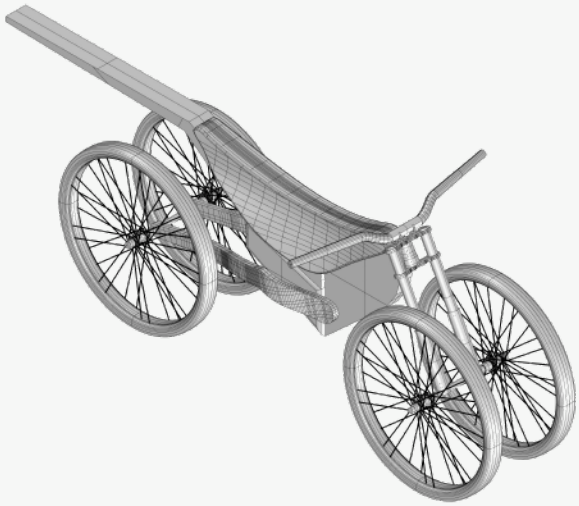




Having accounted for the insights we gained from initial sketching, testing, and researching, we began making complete models in Rhino6 3D.

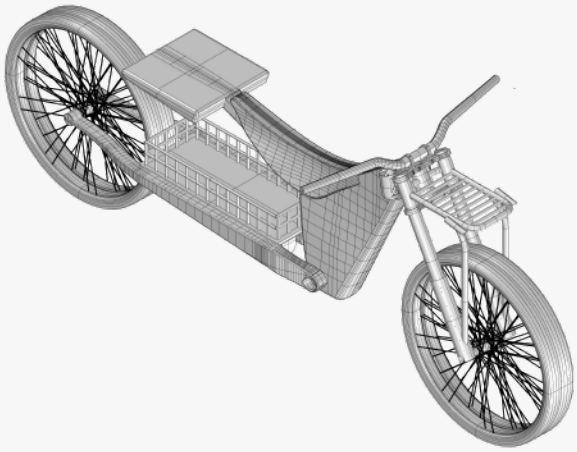
Prototype 1

Focus: 4x4 Design, Initial Form



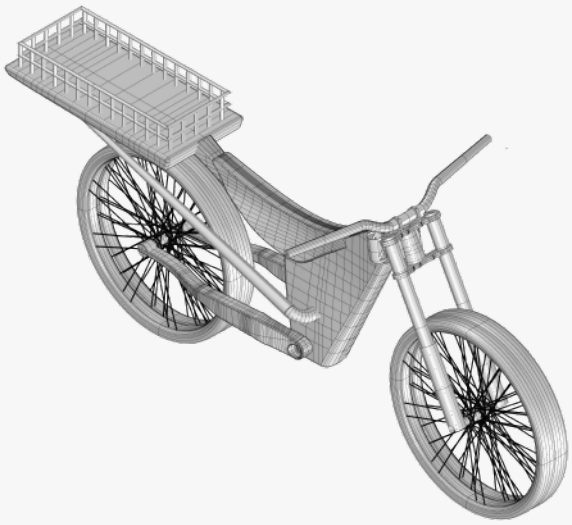
Prototype 2

Focus: 2 Wheel Design, Lower Cargo, Front Rack, Proportional Refinements



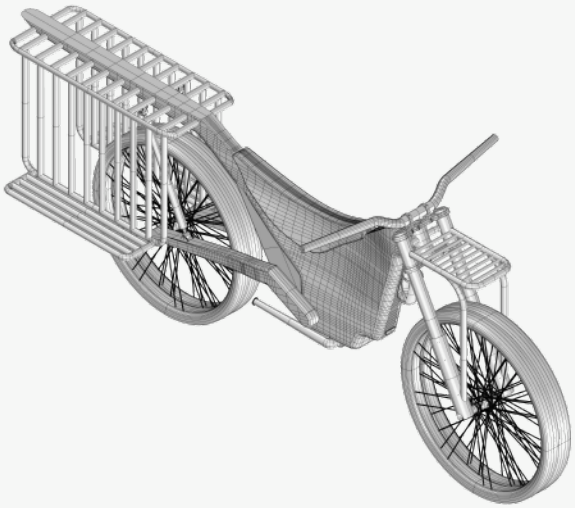
Prototype 3

Focus: Higher Cargo, Traditional Bike Form



Prototype 4

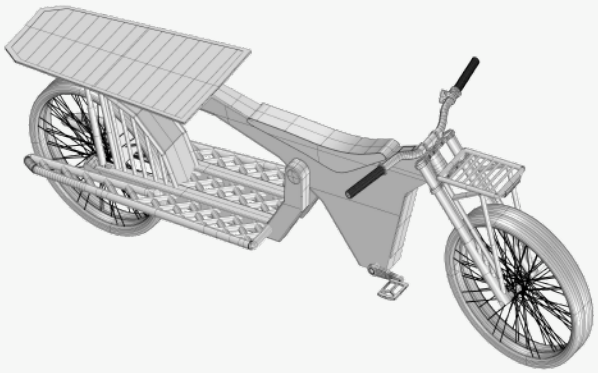
Focus: Rear Rack Refinement, Kickstand Addition,



Of course, there were many other prototypes and iterations beyond those shown here, these iterations mark major landmarks and course changes in the design process.

Prototype 5

Focus: Refined Lower Cargo, Detail Refinement, Combine with Upper Cargp



Prototype 6

Focus: Refine Lower Cargo, Remove Upper Cargo, add Motor, Detail Refinement

Prototype 7

Focus: Remove Lower Cargo, Return to Traditional Bike, Detail Refinement, Refine Rear Cargo

Prototype 8

Focus: Detail Refinement, Proportion Refinement, Weight Reduction, Feature-set Refinement

AXESS E-Bikes

34

DESIGN RESPONSE

DESIGN RESPONSE

DESIGN RESPONSE

DESIGN RESPONSE

DESIGN RESPONSE

DESIGN RESPONSE

Navi Gueira | Cody Snow

PARTNERSHIP | THE BUREAU OF LAND MANAGEMENT

https://youtu.be/DKSVxAssEFc

Navi Guerra | Cody Snow

Dashboard:

Here, the user will be able to change the riding mode of the bike within the app to accommodate for personal skill level or for specific rules and regulations relating to where the user is riding with in the monument. They will also have the ability to connect their device directly to the bike via Bluetooth, unlock and lock the bike, and call for help if needed.

Routes:

Users then have the ability to pick specific destinations to navigate to within the monument. This will directly help issues of trail proliferation by giving users clear directions to a desired location. Tje app will also tell the user the arrival time, minutes remaining, and miles remaining to a given destination.

Suggested Trips:

Here, users have the option to partake in a completely tailored experience, where management has planned out a complete trip with attractions and campsites along a single route.

Profile:

Here the user will be able to plug in their personal information, view the trip history and rankings, be able to per-download Bears Ears maps, and be able to logout as-well.

https://youtu.be/ICjXkCntdgM

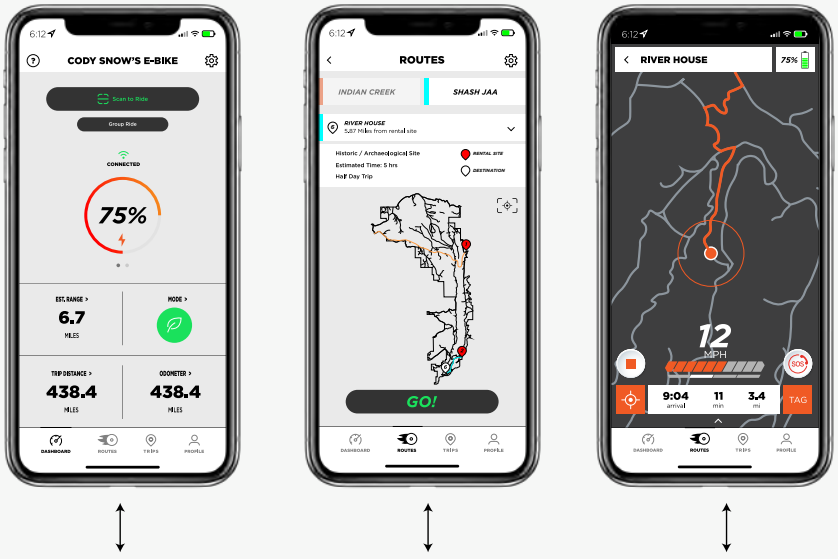
App vs Bike Screen

The app and bike screen are built off one another. Meaning the layout and usability will feel similar for users. Since the app is purely an accessory users will have more in-depth options with the app unlike the screen where it only shows the essentials. Users will be able to use only the screen to complete the trip if needed since service is inconsistent.

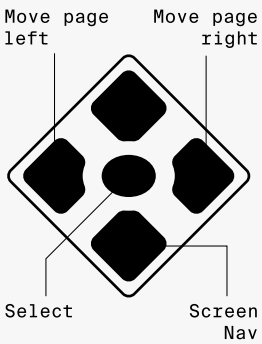
With the Bluetooth capabilities designed into the app users will be able to pair their phone to the bike meaning the on screen display will directly correspond with the input on the app.

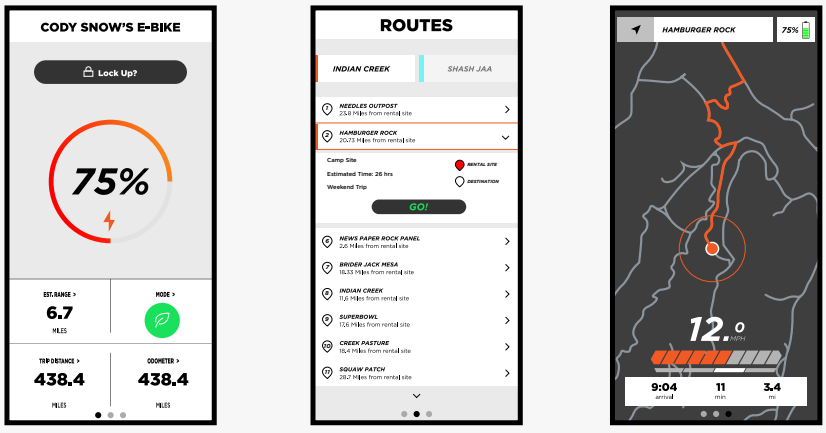
The app has more features because the touchscreen of a smart phone enables it. Alternatively, the screen on the bike will be controlled by a D pad. The D pad dictated how the screen could be laid out and what experiences could be offered.

App Accessory

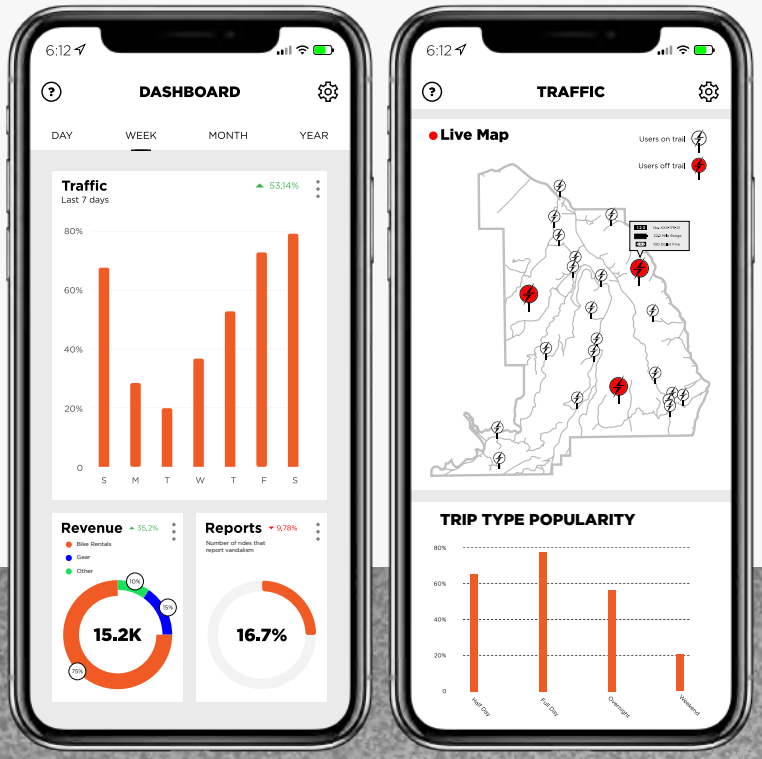


Bike Screen





https://youtu.be/PrSn3YkTYIw



All Axess e-Bikes are equipped with GPS tracking, allowing management to track all bikes in real time and locate users violating trail guidelines.

Management also gains the ability to collect data over time, data that can be then used to modify and improve the experience for subsequent users.

GPS TRACKING

Navi Guerra | Cody SnOw

Partnership | The Bureau of Land Management

Design Response

Trail Proliferation

Trail Proliferation was one of the primary concerns the BLM noted when discussing problems within the landscapes. To ensure Axess e-Bikes are not contributing to further trail proliferation, they are programmed to first notify the user, and if required to automatically shut off if users take the bikes off trail. They would then need to be pushed back to a designated road before they could be started again.

To enforce users to not contribute to trail proliferation the bike will automatically shut off and the user will be notified via the app and bike screen.

Navi Guerra | Cody Snow

Partnership | The Bureau of Land Management

Design Response

Loading Bike

41

In order to embark on tailored experiences within Bears Ears, users will be asked to park at a Rental Site just outside monument boundaries. After receiving their rental users will unload gear from their cars an load it onto the bike

1. The rear and side racks are designed to be modular, utilizing tube stile designs that can be used as anchor points for ratchet straps, bungee cords, or other methods of securing various sized bags.

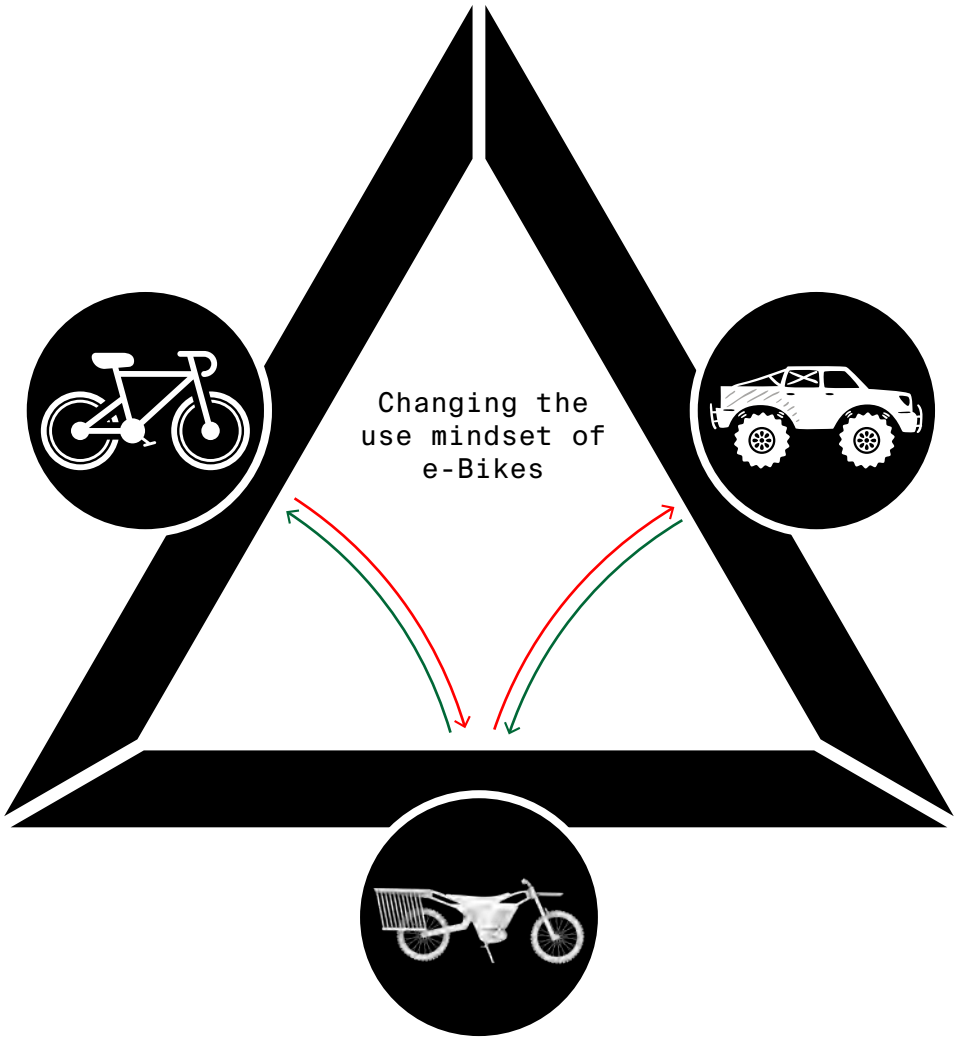
2. NOTE : Heavier items should be placed closest to the center of the bike, Large battery and forks are intended to balance weight distribution.

3. The front rack is indented to contain loose items, however may also be used to carry small bags if necessary.


AXESS
E-Bikes
42
IMPACTS
IMPACTS
IMPACTS
IMPACTS
IMPACTS
IMPACTS
Navi Gueira | Cody Snow
PARTNERSHIP | THE BUREAU OF LAND MANAGEMENT

Traditionally, e-Bikes have been considered the “more destructive” alternative to traditional bikes and mountain bikes. They are heavier, travel faster and further, and require electricity to operate. Thus they might cause trails normally intended for bike and foot travel to degrade faster. For these reasons e-Bikes might be seen in a negative light as a transportation method.

However, we are instead implementing e-Bikes as an alternative to OHV travel, and here, they are the “less destructive” alternative. They are lighter, travel slower, require electricity over fuel, and are quieter all while providing an experience that is equally fun for the user. By changing the mindset around e-Bikes, they might be used to help the earth rather than cause further harm.



BIBLIOGRAPHY

MLA8

An Adventure Travel & Outdoors Blog. “Internal Gear Hub Vs Derailleur: My Pros and Cons List.” Where The Road Forks, 4 Oct. 2020, wheretheroadforks.com/internal-gear-hub-vs-derailleur-my-pros-and-cons-list/.

Assaeed, Abdulaziz M., et al. “Impact of off-Road Vehicles on Soil and Vegetation in a Desert Rangeland in Saudi Arabia.” Saudi Journal of Biological Sciences, Elsevier, 3 May 2018, www.sciencedirect.com/science/article/pii/S1319562X18301153.

Barber, Jeff. “World's Fattest Fat Bike Tire: The Vee Snow Shoe 2XL.” Singletracks Mountain Bike News, Singletracks, 8 Feb. 2017, www.singletracks.com/mtb-gear/worlds-fattest-fat-bike-tire-the-vee-snow-shoe-2xl/.

BILL FINK. “E-Bikes in National Parks: Riding the Wave of Popularity.” Sierra Club, 10 July 2020, www.sierraclub.org/sierra/e-bikes-national-parks-riding-wave-popularity.

BOSCH. “EBike Range Calculator for Bosch Drive Systems – Bosch EBike.” Bosch EBike Systems, www.bosch-ebike.com/us/service/range-assistant/.

BOSCH. “Everything You Need to Know about the Motor for Bosch EBike Systems.” Bosch EBike Systems, 2020, www.bosch-ebike.com/us/products/drive-units/.

BOSCH. “The EBike Battery: Long Range, Low Weight, Easy to Charge.” Bosch EBike Systems, 2020, www.bosch-ebike.com/us/products/batteries/.

Bureau of Land Management. “BLM Seeks Public Comment on Proposed e-Bike Regulations.” BLM SEEKS PUBLIC COMMENT ON PROPOSED E-BIKE REGULATIONS, 2 Apr. 2020, www.blm.gov/press-release/blm-seeks-public-comment-proposed-e-bike-regulations.

Bureau of Land Management. “Information on Secretary's Order 3376 Increasing Recreational Opportunities through the Use of Electric Bikes (SO 3376).” INFORMATION ON SECRETARY’S ORDER 3376 INCREASING RECREATIONAL OPPORTUNITIES THROUGH THE USE OF ELECTRIC BIKES (SO 3376), 22 Oct. 2019, www.blm.gov/policy/ib-2020-003.

Burns, Melinda. “Off-Roaders Leaving Environmentalists in the Dust.” Pacific Standard, Pacific Standard, 24 May 2008, psmag.com/environment/off-roaders-leaving-environmentalists-in-the-dust-4527.

Cygan, Taylor. “UX Case Study: Google Maps vs. Waze Mobile Apps.” Usability Geek, 6 Sept. 2019, usabilitygeek.com/ux-case-study-google-maps-vs-waze-mobile-apps/.

BIBLIOGRAPHY

MLA8

Henri Bisson, Deputy Director. “Off-Highway Vehicle Management On Public Lands.” U.S. Department of the Interior, 25 Apr. 2016, www.doi.gov/ocl/hearings/110/OFVManagementOnPublicLands_060508.

Hilhorst, Didier. “Designing the New Uber App.” Medium, Uber Design, 18 Nov. 2016, medium.com/uber-design/designing-the-new-uber-app-16afcc1d3c2e.

Khan, I., et al. “Alien and Native Plant Seed Dispersal by Vehicles.” Wiley Online Library, John Wiley & Sons, Ltd, 13 Oct. 2017, onlinelibrary.wiley.com/doi/-full/10.1111/aec.12545.

Land Management Bureau. “Increasing Recreational Opportunities Through the Use of Electric Bikes.” Federal Register, 10 Apr. 2020, www.federalregister.gov/documents/2020/04/10/2020-07099/increasing-recreational-opportunities-through-the-use-of-electric-bikes.

Modi, Shaun. “Inside the Design of the Boosted Boards IOS App.” Medium, TMI-Insights from TM, 2 July 2015, medium.com/tm-design-stories/inside-the-design-of-the-boosted-boards-ios-app-6c37acbf860a.

Nortjé, Gerhardus Petrus, et al. “Factors Affecting the Impact of off-Road Driving on Soils in an Area in the Kruger National Park, South Africa.” Environmental Management, Springer-Verlag, Dec. 2012, www.ncbi.nlm.nih.gov/pmc/articles/PMC3497957/.

“Off-Road-Vehicle Bans Seem to Please No One.” The Christian Science Monitor, The Christian Science Monitor, 9 July 2008, www.csmonitor.com/Environment/Living-Green/2008/0709/off-road-vehicle-bans-seem-to-please-no-one.

Ottesen, Jacob. “Case Study: Lime Scooter App- Reservations.” Medium, Prototypr, 9 Nov. 2018, blog.prototypr.io/lime-scooter-app-concept-01-2e74191210b6.

Richard B. Taylor, Certified Wildlife Biologist. “THE EFFECTS OF OFF-ROAD VEHICLES ON ECOSYSTEMS .” A LITERATURE REVIEW OF THE EFFECTS OF OFF-ROAD VEHICLES ON ECOSYSTEMS, tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_t3200_1081.pdf.

U.S. Department of the Interior. Off-Highway Vehicle Management On Public Lands, 25 Apr. 2016, www.doi.gov/ocl/hearings/110/OFVManagementOnPublicLands_060508.

U.S. Forest Service. “Electronic Bicycle Use.” Electronic Bicycle Use , www.fs.usda.gov/visit/e-bikes.

AXESS
E - B i k e s

Navi Guerra: mountainguerra@gmail.com
Cody Snow: snowcody9@gmail.com

THANK YOU