



Humboldt County Association of Governments

Overall Work Program Work Element 20

Humboldt County Bicycle Facilities & Trail Map Research

By: Redwood Community Action Agency

Completed June 2017

1) Purpose & Scope

The purpose of this research effort is to explore and compare functional web-based, interactive platforms for providing bicycle facility (Class I, II, III, etc.) and route information, and provide a report of this information for Humboldt County Association of Government's (HCAOG) use in future decision-making. As the Humboldt County region continues to expand its active transportation network and momentum is growing for the completion of the Humboldt Bay Trail, a new dynamic bicycle/active transportation map is needed to better communicate safe bicycling opportunities.

The scope of this research effort, led by Redwood Community Action Agency (RCAA), is to research a minimum of three bike map platform alternatives, provide an analysis of their functionality, and provide information to HCAOG staff and the Technical Advisory Committee (TAC) about these findings. No preferred alternative is being suggested at this time because availability of funds may dictate next steps, and in the future, an RFP process could bring out more options. While a minimum of three options were to be analyzed, RCAA has explored a total of 10 platforms which we have analyzed for this report, and viewed many more. However, these fall into three basic categories of web-based maps, as explained in section 5.

2) Past Bike Map Efforts

The Humboldt County region has collaborated in the past two decades to produce paper bike maps for the region. RCAA worked with community partners to develop the first edition of the Humboldt Bay Area Bike Map in 2001. The map focused on the areas of McKinleyville to Fortuna, although it also showed an overview of the Pacific Coast Bike Route throughout the length of Humboldt County. The map detailed bicycle facilities and recommended family-friendly, intermediate and advanced bike routes to connect neighborhoods to key destinations. The original bike map was sold in local bicycle shops, book stores, grocery stores, and tourism centers.

In 2012, the paper map was updated in a second edition with current information and facilities and 10,000 copies printed. This update and reprint was funded through a mix of public funding (from the Bicycle Transportation Account) and private donations from community members, businesses and organizations. HCAOG and RCAA collaborated on map distribution to local jurisdictions, bookstores, bike shops and tourism centers, and all copies were distributed as of winter 2015.

While the second edition paper maps have been fully distributed and flew off shelves, there continues to be interest from visitors, local residents and local bike shops in getting access to more maps. DHHS Public Health, Healthy Communities division saw an opportunity to support a third edition update to the Humboldt Bay Area Bike Map for their Safe Routes to School education efforts in local schools. DHHS Public Health, Healthy Communities division is currently providing funding to RCAA to update the paper map. RCAA worked with HCAOG staff and TAC members to make updates to the draft third edition paper bike map as there have been many new bicycle trails, lanes and routes implemented throughout the region in the last five years.

After the anticipated completion of the Humboldt Bay Trail North and Eureka Waterfront Trail, RCAA expects to complete the third edition bike map and do a small print run in early 2018. While this updated map will meet the needs of several hundred local residents and visitors, there continues to be a higher demand for these maps than our region currently has the capacity to provide.

3) Benefits of an online, interactive map

Meets multiple HCAOG objectives

An online map would support HCAOG's stated objectives and meet local priorities by increasing knowledge of active transportation routes, decreasing likelihood of bicycle accidents, supporting goals in the Humboldt County Regional Bicycle Plan and VROOM Regional Transportation Plan, including those identified in the Complete Streets element, Commuter Trails element, Public Transportation element, and Tribal Transportation element, and achieving greenhouse gas reduction goals for the region. Additional objectives that implementation of an online map would address include the following.

Improves health

An online map would make it easier for local residents and visitors alike to select safe and active modes of transportation and improve public health, including a reduction in childhood and adult obesity rates. Sharing safe options for transportation could also serve to improve mental and emotional health of residents and improve perception of safety and well-being in neighborhoods and throughout our local community.

Benefits the local economy

Established information about local trails and bicycle facilities would help attract more visitors to the local area and customers to local businesses, offer opportunities for advertising and sponsorship that would connect businesses with new customers, increase property values, and could serve to attract new employers or employees in much-needed sectors, by providing information about local quality-of-life resources.

Encourages multimodal commuting

Widely available online bike route information would increase the proportion of trips accomplished through active modes, and improve multimodal commuting in Humboldt County. Multimodal commuting may alleviate traffic congestion especially during peak hours and around schools and employment centers.

Increase accessibility and equity

Online map information would ensure that disadvantaged communities are able to equitably share the benefits of active transportation and improved access to information. Additionally, safe routes for bicycle travel and associated traffic calming and signage measures would also serve to provide information to users of other modes. Some developers of online maps have numerous ways to improve accessibility for the visually-impaired, deaf, adaptive bicycle users and other users for whom accessibility features are important. Through the "ReachOut

Wireless” program and other programs that have worked to meet the needs of low-income residents, the LifeLine program has been replaced by cell phone distribution to people who need low-cost phones. Some of these phones are able to access basic web information, and some are smart phones. Therefore, some low- to very low-income individuals are able to access online maps using a wireless device, regardless of whether they have access to a personal computer at their place of residence or not.

4) Stakeholder outreach

HCAOG staff led the outreach to community stakeholders for this project. HCAOG staff attended a Visioning Session in April 2017 put on by the Humboldt Trails Council (HTC) which brought together several dozen community trail advocates, cyclists, and local agency staff. Attendees provided input on the types of features desired in a potential online, interactive bike map for Humboldt County and what bicycle facilities and routes should be updated on the existing 2012 paper map. Community members cited several platforms researched here (e.g. mountainbikeproject.com, Avenza Maps), and provided information on the type of features to include in such a map – restroom locations, whether trails allow dogs, ADA accessible trails, downloadable map pdfs, and a way to provide feedback on trail/route conditions and maintenance needs.

HCAOG and RCAA staff provided a brief update on this project at the April 2017 TAC meeting. TAC members provided feedback on the draft updates to the third edition of the paper Humboldt Bay Area Bike Map in conjunction with mapping updates for HCAOG’s draft 2017 Bike Plan and Regional Transportation Plan Update. Several local jurisdictions provided updates on new extents of Class II bike lanes that were incorporated into the draft paper map update.

HCAOG staff also provided information on this project to the Service Coordination Committee (SCC) and Social Service Transportation Advisory Council (SSTAC) at their meetings on May 15, 2017. The SSTAC noted that Humboldt receives a lot of bicycling visitors that travel to and through the north to south corridor in Humboldt. Providing interconnectivity information (North, South, East and West) between jurisdictions (Trinidad to Southern Humboldt for example) would be very important if want to include and attract visitors to the area. Having access to an interactive map for mobile devices would be very beneficial, but also important to have the ability to download information, and view information from a fixed computer program.

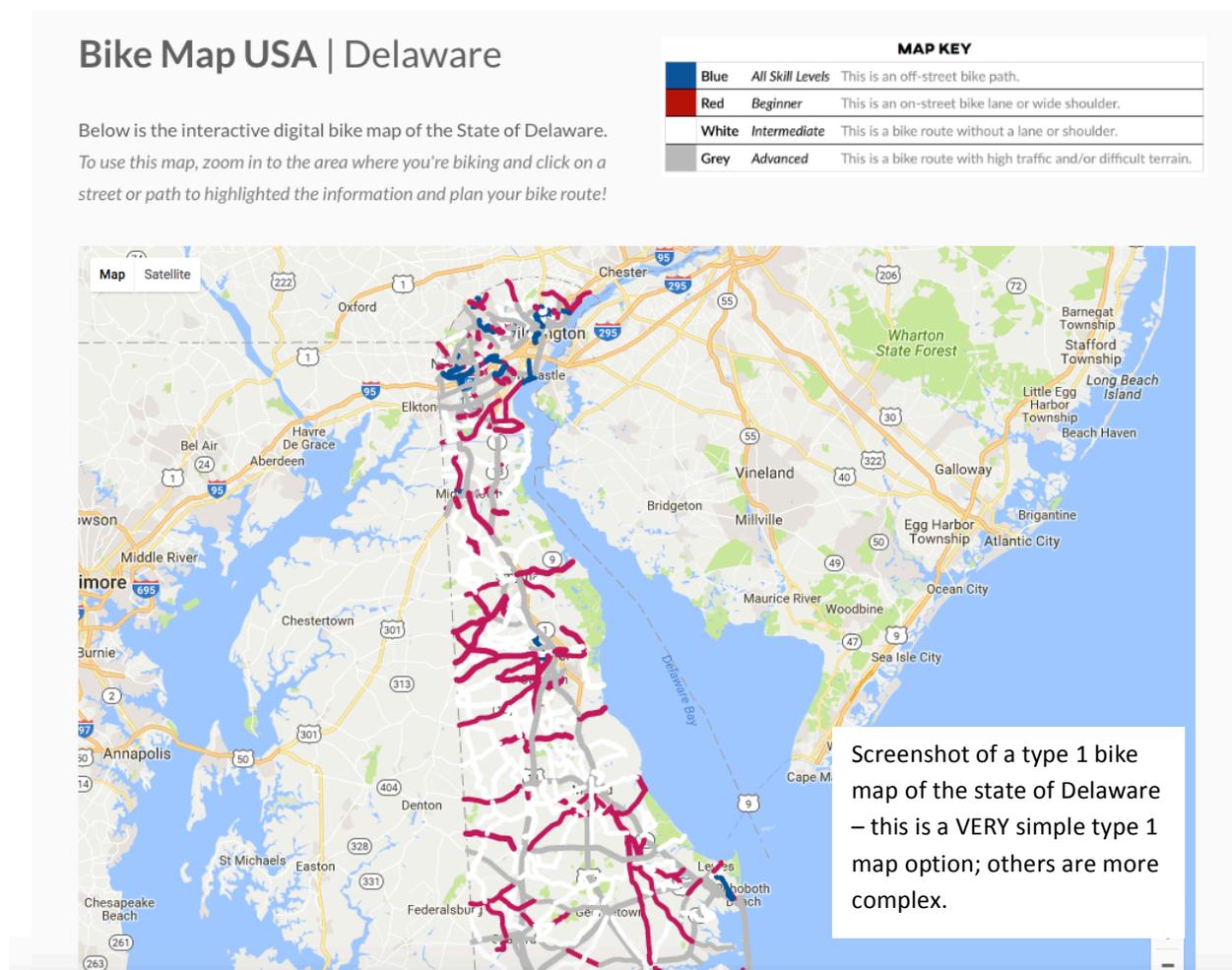
HCAOG staff reached out to Tri County Independent Living in Eureka, a non-profit agency that supports individuals with disabilities in Humboldt County. Tri County Independent Living provided the following comments: include big and thick map lines on main thoroughfares to help them stand out, for street names use a font size that is large and easily readable, provide a map legend large enough for easy reading, caution in using too much of one color on map as it can be confusing (example too much green), ensure scales on map are all the same.

RCAA also engaged in several informal conversations with representatives from Humboldt Bay Bicycle Commuters Association (HBBCA) and Redwood Coast Mountain Bike Association (RCMBA). RCMBA emphasized the importance of including recreational mountain bike trails in a local interactive bicycle map, as their group actively promotes local mountain bike trails outside the area and hosts events that bring in hundreds of visiting cyclists. HBBCA mentioned that bicycle safety information and “rules of the road” were important features of the paper bike map, and that it would be helpful to include this information somehow in an interactive map.

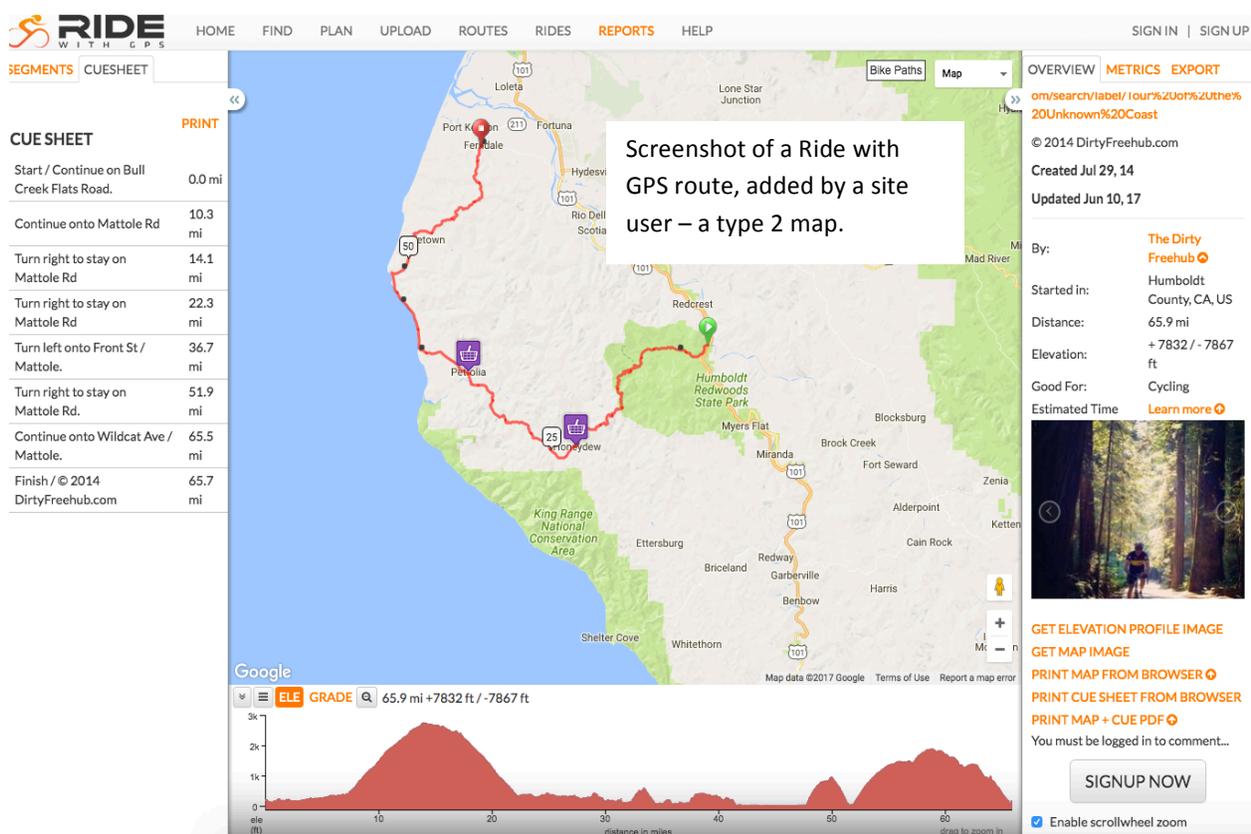
5) Research into pros and cons of alternatives for online platforms

Three Types of Online, Interactive Maps researched:

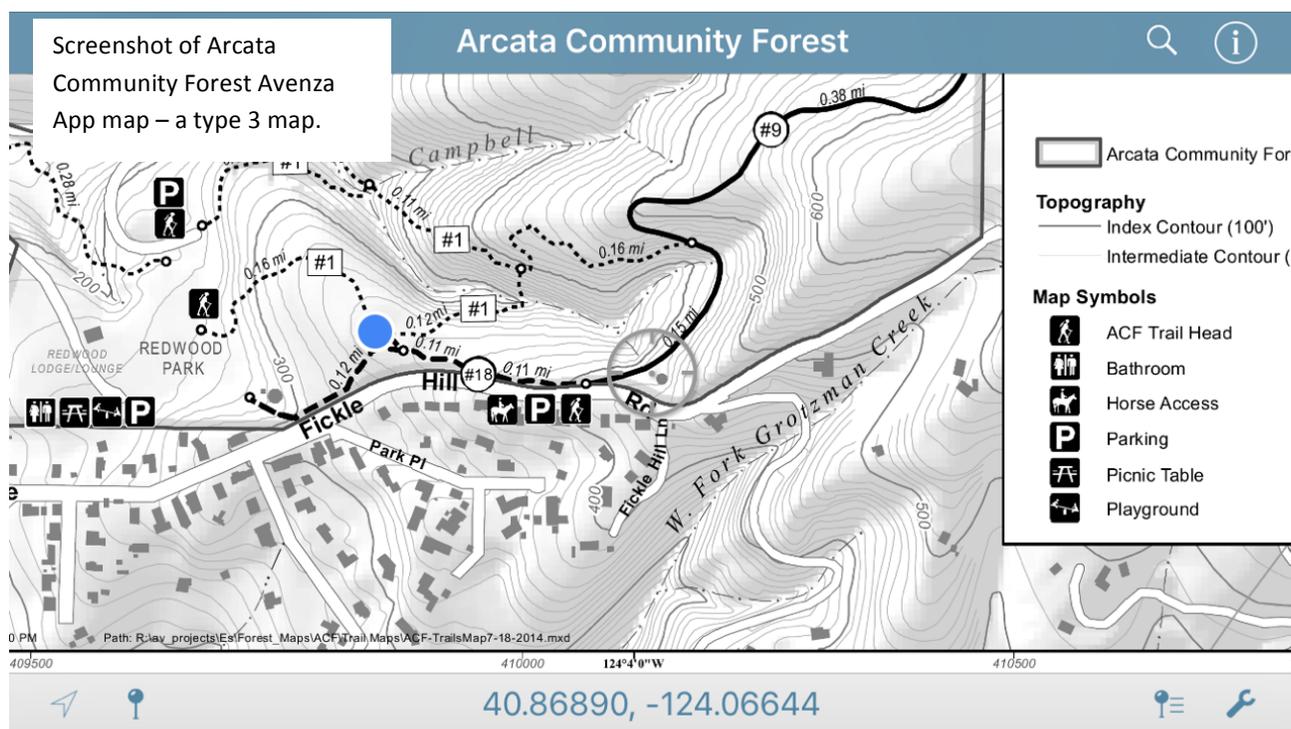
- Type 1 – Website and/ or App (application for Apple or Android devices) built to user’s specifications. A Type 1 map would include a customized map showing detailed information for each municipality and a customized route-planning tool. Positive aspects of this choice include the level of control over the data available, design and functionality of the site/ app, user-friendly and accessible design, option to provide updates to Google for improved mapping, ability to have a high level of detail about a ride, ability to sync with social media or provide opportunities to share info about a route, downloadable information for offline use, opportunity for advertising for local businesses that cater to or wish to attract bicyclists, and possibly greater legal protections, were a bicyclist to be injured on a recommended route. The only foreseeable potential “downside” is cost, which is greater for this option. See table on page 6 for Type 1 examples that RCAA analyzed.



- Type 2 – Website and/ or App that is already online. A Type 2 map would be available via a website and/ or app that has been developed by someone else, and would consist of routes or specific rides that are added by users of the site/ app. In some cases, these routes can be “locked” by the person or agency who enters them, and in some cases they are all editable by any user. These are commonly used for recreational rides or routes that bicyclists wish to share with other bicyclists, but some are also added or designed by government agencies to promote health and tourism in their community. Positive aspects include the widespread use of these platforms by the bicycling community, ability to sync with social media or provide opportunities to share info about a route, a sense of “democracy” since people can add routes, ability to add recreational rides and opportunities, the low cost of using this approach and the variety of attractive options available already. Downsides include the risk that a site or app could “fall out of favor” and fail to be maintained by whoever supports it, potential for unwanted advertising from the site or app, lack of control in some cases over who adds, edits or comments on routes, lack of clarity about ideal route planning options, some limited functionality on a desktop computer for some platforms, and lack of control over design changes or features that are modified by the platform’s administrator/ designer. See table on page 6 for Type 2 examples that RCAA analyzed.

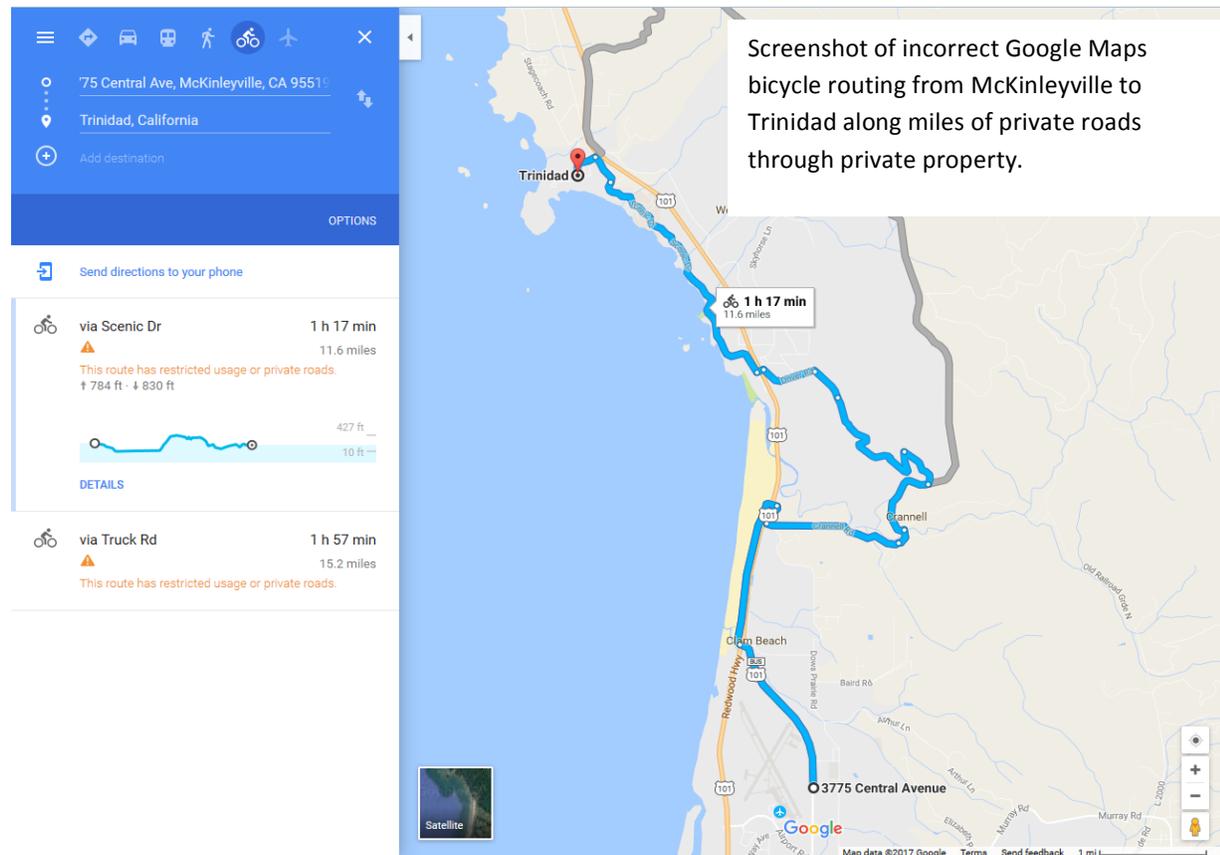


- Type 3 - Location-enabled PDF. A Type 3 map could be used in conjunction with an app that allows the user to download a map, and then shows them where they are on the map using geospatial information and the location tracker on their phone. It is intended to be used with a smartphone or possibly a tablet, but not a desktop computer or laptop. Positive aspects include the low cost, “no frills” functionality which can appeal to a variety of users, and the possibility of using the existing Humboldt Bay Area bike map as a base map. Potential downsides could include limited detail about bicycle facilities, some dislike of these apps expressed by users, lack of ability to add to the map easily, and limited opportunity for sponsors/ business partners. See table on page 6 for Type 3 examples that RCAA analyzed.



Why not just rely on Google maps?

Google does provide bicycle routes when users are seeking directions, and provides a bicycle as a mode of travel. However, there is very limited information and route data about bicycle facilities for many communities in our region. Therefore, Google Maps can often route bicyclists based on information that is often outdated or just plain wrong, including onto private property, on “zig-zag” or nonsensical routes, and not on separated trails or facilities, especially new facilities.



Additionally, it is difficult to update Google Maps and get a response from staff when new information about bike facilities is available. There are numerous examples of new residents or tourists being shown outlandish or dangerous online routes when locals know of a very sensible, enjoyable and safe alternative.

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June 2017

Alternatives analysis for online, interactive bicycle facilities and trail map

Name of Map Platform/Service	Type of Platform (App, interactive pdf, website, etc)	Type 1, 2 or 3	Link to Example Map	Cell Service Needed to Use? Or Can Download to Use Offline?	Cost to Create	Maintenance Needed? And Cost of Maintenance?	Ease of Updating Data	Key Design Features	Platform Easy to Navigate for the User?	Level of Detail Available about Routes, ADA accessible, and Skill-Level Required?	Can Local Business Sponsors/Local Sites/Economic Development Info be Included on the Map?	Aesthetically Pleasing Platform?	Multiple basemaps? (e.g. google maps, satellite, topo)	Universal Accessibility Features?	Compatible with Other Apps? (Yelp, Bus ticketing, Social media)	Can Users Provide Feedback/ Report damage, trash, etc?	Other Notes
Trailhead Labs	Interactive data overlay on a basemap; Can develop a native app (an app for use on a specific device, can use smartphone features that are part of its operating system)	3	El Dorado County, CA Bike Map: http://www.eldoradobikemap.org/ Napa County, Ca Bike Map App: map.napaoutdoors.org	Mobile-responsive, but Map Builder is not offline capable/ Offline capabilities in the global native app, can download various file types.	Could do a simple map very, very cheap. Very willing to work with us to what we can afford. We would need to create/find new data like rural cycling routes.	Annual subscription/ access/ maintenance ~\$2,500-3,500.	THL helps agency load their data into OuterSpatial and then agency can make their own map. There is also a Manager feature, that we might not need at first. Agencies can add in photos, etc. Manager is more built for the mobile app. With manager, instead of just a link to a website a slideshow of photos or more detailed description would pop up.	Can group trails/routes. Link to other websites. Can set customizable zoom. Can create multiple embedded maps and place these maps in different places.	Easy to zoom and navigate. Responsive design and responds to different screen sizes.	THL helps agency load their data into OuterSpatial, then agency has the ability to edit and refine the map and symbology. Can have quite a bit of detail and levels of routes, etc. Manager allows even more opportunities to add info about ADA accessibility, etc.	Yes, can add links within the data/map to a ticketing app, partner websites etc. Very customizable.	Yes	Yes, particularly the outdoors focused basemap which they have refined a lot, also streets map, simple map, topo, satellite, etc. Whole library to choose from. Can set default and options.	ADA accessibility is much better on their maps than others. Section 508 compatible. Website has capability to tab over and click on things...indicates what is active on their browser for low-vision users. Also they have made color palettes so that color blindness concerns not as much of a factor.	Yes, can add links within the data/map to a ticketing app, partner websites etc.	Yes	THL has worked with the US Forest Service, Napa Open Space District, multiple agencies at once, CA State Parks, Bay Area Ridge Trail. THL does not pull in Google Maps...so you have more control (no illegal trails shown, etc). Symbology and colors can be changed very easily.
My City Bikes	Interactive bike map	3	State of Delaware online bike map: http://www.mycitybikes.com/bmusade.html	Yes	\$3,465 for very basic map	Yes, \$675 per year	Easy, may incur additional costs depending on complexity	Simple, Google-maps based, shows routes for different skill levels in different colors	Yes	Minimal, simple, addresses skill level but not much else	Not in this example, but quite possibly	Moderate/basic	Yes, uses Google basemaps	Some	Yes	Yes	
My City Bikes	Native app (app for use on a specific device, can use smartphone features that are part of its operating system)	2	Grand Rapids, MI Area Recreational Bicycling App: http://www.mycitybikes.com/betde1dckm.html	Offline capabilities in the global native app, can download various file types.	\$9,000 - 12,000	\$8,500 - 9,500 per year	Easy; part of maintenance cost	Simple layout, bright colors and intuitive design	Yes	High level of detail	Yes	Yes	Yes, based on desired characteristics chosen	Yes	Yes, based on desired characteristics chosen	Yes	Examples shown on their website include apps that also serve pedestrians and other modes. Seem to have a significant bicycle tourist-attraction focus.
MTB Project	Trail gpx segments overlaid on a basemap	2	https://www.mtbproject.com/	Yes to download gpx, but not if have already downloaded a specific trail segment file.	Staff time only	An agency does not have exclusive control over their data	Easy to update or modify routes once created	Trail segments are downloadable individually as gpx files	Yes	Nicely laid out, section for notes, good map and elevation information	Unlikely, this site is supported by the REI company and exclusively markets their products.	Yes, very obviously mountain biking related "look"	Yes	Some	Yes	Yes	This site is supported by/ sponsored by REI, an outdoor gear company.
BikeMap.Net	Website and App	2	https://www.bikemap.net/en/route/2035867-commute-route-from-alameda-ca-to-berkeley-ca/	Yes for website or app, options to download as GPX, PDF, other	Staff time only	Occasional check of routes to ensure they are still posted	Easy to update or modify routes once created	Color map with lots of detail and options for map base. Nice design with route detail.	Moderate, there are many options to choose from that could overwhelm the user. Not as functional on a desktop as a mobile device.	Good detail, base map options offer a lot of information, especially in the urban environment	Unlikely	Yes	Yes	Some	Yes	Yes	Bikemap.net claims to be the largest collection of cycle routes in the world. Has a very large user base
Transit & Trails	Website and App	2	http://www.transitandtrails.org/	Yes, but not available yet, as this is still in development.	Still in development, costs not estimated.	Paid maintenance provided by developer of site, costs currently	Easy; part of maintenance cost	Similar to Google trip planning elements, but more aesthetically pleasing, spare, photo-	Yes	Appropriate level of detail while remaining simple	Yes	Yes	Yes	Yes (Trailhead Labs designed, so line one applies here)	Yes	Yes	
Ride with GPS	Website and App	2	https://ridewithgps.com/	Yes for website or app, options to download as GPX, PDF, other	Staff time only	Occasional check of routes to ensure they are still posted.	Easy to update or modify routes once created.	Color map with lots of detail and options for map base. Nice design with route detail.	Yes	Nicely laid out, section for notes, good map and elevation information	Unlikely unless someone puts these in the notes section for a ride.	Yes	Yes	Some	Yes	Not sure	
AllTrails	Trail segments overlaid on basemaps	2	https://www.alltrails.com/explore/us/california/eureka	Yes, but only with paid version (AllTrails Pro, \$2.50 per month)	Staff time only; cost to user to download or print maps unless they use a screenshot	Occasional check of routes to ensure they are still posted.	Easy to update or add new routes.	Color map with lots of detail and options for map base and layers.	Yes	Nicely laid out, section for notes, good map and elevation information	Not sure	Yes	Yes	Some	Yes	Not sure	
Avenza Maps	Geospatial pdf reader app	1	Arcata Community Forest Map - http://www.avenza.com/avenza-maps	Can download to use offline, but doesn't geolocate if user is offline/ out of service.	No cost to upload to Avenza, but must provide a map and all data in a supported format. Some up-front costs.	No maintenance needed once uploaded.	Would need to update and reload base PDF, probably	Topo lines, clear legend, black and white design	Yes	Fairly detailed - black and white, topo lines, trail types and surfacing described well in key. Could vary by map designer (not necessarily an Avenza feature inherently)	Possibly (app does allow for "in-app purchases" but wasn't relevant for Arcata Community Forest Map)	Moderate/basic	No for ACF map, others may	Some	No	Not sure	Allows user to "drop a pin" for locations of note. Types of files supported: GeoTIFF, GeoPDF, JPG/ JGW, Geospatial PDF. Avenza maps has a low rating as compared to other Apps on iTunes (less than 2 stars out of five) but seems to work well for use of this particular map.

Summary narrative with recommendation of three alternatives

All three types of maps have their pros and cons, as indicated above. However, a Type 1 map that compiles all locally available route data, promotes trip planning that is suited to the transportation route alternatives available, and includes a design developed to meet the needs of our local residents and visitors, as well as that offers a platform for businesses to sponsor and promote themselves to bicyclists, would be the ideal. This would involve digitizing local data and developing a platform where the bike map would be visible in whole at first, with an easy to use route-finding tool to choose an appropriate route for the bicyclist's needs. The cost for this option would be the greatest, commensurate with the level of detailed and relevant information it would offer, and the skill it would take to design something exclusive to Humboldt County's needs. Hiring an experienced consultant to develop this type of platform would allow local jurisdictions to have input about the functionality and design, would reflect the most up-to-date locally available information, and would ensure that the platform is supported in the long-term. This is especially important because there is a high degree of tech innovation currently that is short-lived, so many free apps, sites and platforms for getting information online disappear once they have fallen out of favor, or if they fail to find an effective way to "monetize" the technology used. This option would support sharing of information about bike routes and places of interest to social media, which is of ever-increasing interest. Recreational rides, local sites of interest and other tourism-supporting and business-supporting services could be supported readily, and would be an excellent way to fund development of this online tool. All of the apps we explored are free for the user.

For the promotion of recreational rides and tourism, use of a Type 2 app/ site would be appropriate. However, as mentioned above, not all of these will remain supported long-term, so this is a temporary option. This also does not address the need for customized route-planning information for transportation purposes, i.e. for a person to enter their starting address and their destination, then find an effective, fast and safe route suited to their skill level. Only pre-identified routes will appear, which are great for people seeking a fitness ride or recreational ride. We would not discourage use of Type 2 platforms to promote recreational riding – they are already in use locally by bicyclists who wish to share their favorite rides – but they are likely not going to address the need we have laid out here for accurate and appropriate transportation-focused information. Type 2 platforms do support sharing of information about bike routes and places of interest to social media. The ones we explored were not as effective when used on a desktop/ laptop computer, and are primarily geared at mobile device users, i.e. smartphone users. This option would be free to use, but would take a moderate amount of staff time to upload routes to the platform. It would be wise to upload the same routes to multiple platforms as they attract different users. Again, this is mostly for recreational/ sight-seeing/ fitness rides. All of the apps we explored are free or very low-cost for the user.

A Type 3 platform would be a "low-hanging" fruit option that would allow existing map imagery to be downloaded by users, and allow for location tracking on a mobile device. It would also not provide customized route information to the user; they would have to figure

it out for themselves. The Type 1 option we explored was not really intended for use on a desktop/ laptop computer, and was intended for use on a smartphone. The updated file that is used for the paper version of the bike map could be viewed online as a static PDF as well as downloaded as a PDF, if desired by HCAOG. However, just placing the PDF online for download would not enable geo-locating for users, which the Type 1 platform would allow. This option would be relatively low-cost, as it would use the paper bike map as a starting point. It would be ideal to work with a cartographer or graphic designer to add features and separate these maps for use with an app. A little more research would be needed to select an app to use, and tailor file type, design and other specifications to the app's requirements. All of the apps we explored are free for the user.

Data Preparation, Phases and Cost

Additional data is needed for either a Type 3 or Type 1 online map. While local governments and HCAOG have much of the data in GIS-compatible files already for bike lanes, trail and most roads, some shapefiles for routes would still need to add function to have a geo-locating map of any kind. This background data collection would be needed regardless of whether a "simple" geo-locating PDF or a more detailed Type 3 map with route-planning capabilities is chosen. Some companies who build Type 3 mapping sites/ apps do more of this data collection than others, but it comes at a significant cost. Often they work with local sub-contractors to compile this data to reduce costs.

If cost is a significant constraint, a phased approach could be used, starting with a Type 1 platform, a GPS-enabled PDF map used with an app. An estimated cost to complete this option is \$3,000. This is for costs once the data mentioned in the paragraph above is compiled and ready for use.

The cost of designing and implementing a Type 3 local online bike map site and app option is in the range of \$5,000 to \$10,000. This is, also, for costs once the data mentioned in the paragraph above is compiled and ready for use. This option would be by far the best to meet local needs and offer the full range of desired outcomes.

It would be smart for local tourism organizations or local government staff to add bike routes that include sightseeing, longer rides, loop routes for fitness-oriented cyclists and other recreational rides to any number of Type 2 apps/ sites. However, this would not accomplish the goals of the primarily transportation-oriented project as described here, so it is not part of the phased approach suggested at this time.

6) Recommended next steps

Planning next steps

This research report lays out potential bike map platforms that could help to promote active transportation and connection to transit by local residents and visitors alike. However, HCAOG could consider expanding the geographic scope and focus of such a map to include recreational trails and rural cycling routes as well. There would be many benefits to expanding the scope of the map including providing bicycle route recommendations for smaller communities in Humboldt County such as Blue Lake, Rio Dell, Trinidad, Ferndale, and unincorporated areas like Redway and Westhaven. In addition, community groups such as RCMBBA and HTC may be able to offer collaboration to support and implement a map that also showcased recreational trails.

While HCAOG may be best suited for attracting state funding for an online, interactive bike map, further collaboration with community organizations and businesses may be helpful for attracting private donations/investment. A convening of local community groups invested in advancing bicycle transportation and trails locally may be helpful to prepare for fund seeking in early 2018.

Even if funding is identified to implement an interactive map, it will take time to collect, prepare and digitize bicycle route and facility data and additional point data (e.g. location of bicycle shops and bus stops). Although HCAOG is currently updating its Bike Plan with updated existing and proposed bicycle facility data from each local jurisdiction, there will still be quite a lot of point and route data to gather and digitize (e.g. family-friendly routes on shared use roadways, advanced cycling routes, and location of bicycle shops). HCAOG could consider incorporating this data collection phase into the potential scope of a proposal for bike map implementation funds.

Implementation funding opportunities

As with the successful second edition of the paper Humboldt Bay Area Bike Map, we foresee a mix of public and private funding being the best opportunity to realize an effective web-based, interactive bicycle map. The upcoming Cycle 4 Active Transportation Program (ATP) call for projects through the California Transportation Commission may be a potential funding source. A non-infrastructure (NI) proposal through the ATP for an online bicycle map to increase commuting by bicycling and walking may be competitive in the statewide or small rural categories. Other rural counties have been funded for similar NI bike map projects through the ATP including El Dorado County. The Cycle 4 call for projects is expected in early 2018. Per the ATP scoring criteria, projects with matching funds score higher, so securing additional dollars for a bike map effort is imperative.

Local foundations and community funding entities may also be considered for an interactive bike map, as the platform would be able to tie in with economic development efforts. The Humboldt Area Foundation previously supported the second edition paper map and could be a potential funder for future efforts. The McLean Foundation may be interested in supporting this effort as the existing map focuses on the Foundation's service area of Fortuna, and the City of Fortuna is currently making many improvements to bicycle and walking

infrastructure in the city. As promotion of local cycling routes may tie in with economic development efforts, the Headwaters Fund may also be a potential funding source for a mini-grant of up to \$1,500 or an even larger investment. If the map includes a focus of attracting visitors to Humboldt County to experience local trails and bicycle routes, it may be appropriate to approach the Humboldt Lodging Alliance and Visitors Bureau for funding support. The Humboldt Lodging Alliance in particular would be interested the connection between the bike map and attracting visitors to stay overnight an extra day in the shoulder or off-season.

Community organizations, bike clubs, local businesses, and individual community members contributed a significant portion of the funds to update and print the second edition paper bike map. An even more accessible and interactive bike map would likely gain further support from these groups. Local crowdsourcing to attract individual donations may also be a possibility if in collaboration with a community organization.

Once implementation funding is secured, many top platforms require a yearly subscription fee or maintenance fee. It is recommended that HCAOG consider such an investment as a yearly element in the Overall Work Program.