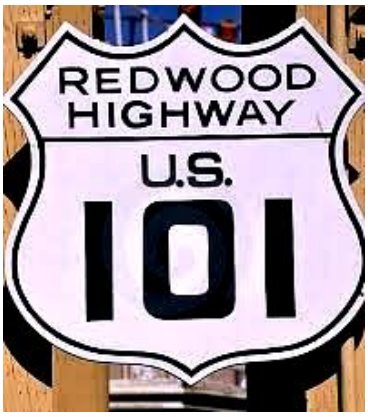
11. GOODS MOVEMENT ELEMENT

The Goods Movement Element discusses what resources, needs, and opportunities the region has to transport goods and passengers via surface (roads/highways), maritime, aviation, and rail transportation.



EXISTING GOODS MOVEMENT SYSTEM

INTERMODAL GOODS MOVEMENT

To move goods efficiently over long distances, transportation systems must maximize viable land, sea, and air routes. An efficient intermodal transportation system will connect available highway, rail, port, and aviation facilities, and thereby give shippers and receivers access to inter-regional, national, and international markets. Port-rail connections can move large quantities efficiently, especially heavy bulk products such as sand, gravel, cement, and timber. Trucks can move smaller quantities faster because they can deliver to a buyer's doorstop and eliminate time spent offloading goods from a ship or train. Perishable products (flowers, produce, dairy) and overnight or emergency deliveries are moved most efficiently via air-truck connections.

In Humboldt County, the goods movement system includes highway (trucking), maritime, and aviation facilities. The common transportation facility that connects the three is U.S. 101, which accesses the county from north to south, and links Humboldt's cities. Major freight facilities that access U.S. 101 include the Port of Humboldt, the Redwood Coast Airport (formerly the Arcata-Eureka Airport), Murray Field Airport, and State Route 299 (and the NWP railroad line, albeit defunct). State Route 299, which junctions U.S. 101 in Arcata, is the main route for truck transport to/from eastern Humboldt County and Trinity County. State Route 255 (Arcata to Samoa Peninsula) is also an important intermodal route for the Port of Humboldt Bay. Additionally, Washington Street in Eureka has been designated as a route of intermodal significance because of its rail, port, highway, and pipeline accessibility. Figure 11.1 Harbor/Marine Facilities and Figure 10.1 Airports (see Maps Tab) show system facilities for moving goods into, out of, and within the county.

> California residents and businesses rely on the freight system to access goods, get shipments delivered, and to access the global marketplace. Efficient, reliable, and sustainable ports, intermodal facilities, railways, truck routes, and air traffic, are integral to the growth and success of California's world class economy.
>
> *– CA Transportation Plan 2050 (Draft)*

Freight Transfer (Transload) Facilities

Intermodal freight transfer facilities provide safe access, dedicated space, and sometimes storage for transferring (transloading) freight from one mode to another. Transloading also allows shippers to combine smaller shipments into a large one (consolidate), or, conversely, divide a large shipment into smaller ones (i.e. deconsolidate). There are currently several intermodal transfer facilities in the region; some are in use and some are not. Such freight transfer facilities include: the Schneider Dock on the Eureka Waterfront (port-truck transfer facility), Fairhaven

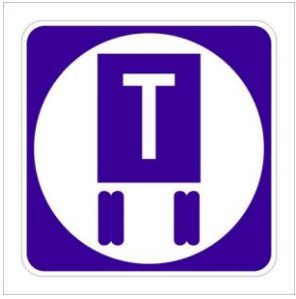
Terminal, California Redwood Chip Export Dock and the Sierra Pacific Terminal at 14th Street, on Humboldt Bay, and the Redwood Marine Terminal (#1 Redwood Dock, #2 Freshwater Dock) in Samoa.

HIGHWAY/TRUCK TRANSPORT

Surface transportation via truck is the most-used mode of moving freight in Humboldt County. Goods shipped by sea and by air are almost always transferred to trucks to be delivered to their final destinations. Thus, freight trucking provides a vital delivery link for international, domestic, and local markets and suppliers. Local trucking service represents the largest share of truck traffic in Humboldt.

Major Truck Routes

The highway system in Humboldt County includes routes designated Terminal Access, California Legal Network, and California Legal Advisory Routes. Terminal Access Truck Routes are portions of State routes or local roads that allow STAA trucks, which are commercial trucks that conform to the weight, width, and length standards allowed by the federal Surface Transportation Assistance Act (STAA). State Route 299 is free of STAA restrictions since Caltrans (District 2) reconstructed Buckhorn Grade in Shasta County in 2017; it is now designated an STAA Terminal Access Route between Interstate 5 and U.S. Highway 101. State Route 299 is the only STAA route serving the Port of Humboldt Bay. U.S. Highway 101 is a Terminal Access Route in Humboldt County except for a five-mile stretch from the Humboldt/Mendocino County line to Richardson Grove State Park. To move freight through this five-mile stretch, haulers driving longer STAA-conforming trucks must unload the cargo and transfer it to shorter trucks that are allowed on this section of highway. (There are some size exemptions, such as for cattle trucks.) Transferring freight adds to transport costs.



Terminal Access Route symbol

Unlike STAA trucks, California Legal Trucks have access to the entire state highway system. In short, STAA trucks can be longer than "California Legal" trucks. The California Legal Network highways in Humboldt are:

- SR 299 (Arcata to Trinity County)
- SR 255 (Eureka to Arcata)
- SR 211 (Fernbridge to Ocean Avenue in Ferndale)
- SR 200 (McKinleyville to Blue Lake)
- SR 96 east of Junction Route 169 (Willow Creek to Yreka)
- SR 36 in Humboldt at its eastern end (near Alton) and western end (Van Duzen River Bridge near Dinsmore).

On trucking routes designated as California Legal Advisory Routes, the California DOT (Caltrans) advises that trucks should have semi-trailers shorter than the 40-foot kingpin-to-rear-axle (KPRA) distance that is allowed on the rest of the California Legal Network. KPRA advisories range from 30 to 38 feet. Routes are restricted primarily because they have narrow lanes or tight radius curves. The tight curves make it difficult for longer trucks to stay within their lane while going around tight curves.

Humboldt's southern 5.1 miles of U.S. 101, at Richardson's Grove State Park, is a California Legal Advisory Route. It has a KPRA Advisory of maximum 32 feet long (livestock trucks are exempt from this restriction), which effectively prohibits STAA trucks.

However, Caltrans (District 1) has designed a project for U.S. 101 through Richardson Grove State Park to give STAA trucks access northbound into Humboldt. The project proposes to reconstruct 1.1 miles of U.S. 101 to "realign and widen curves and obtain two-foot shoulders in the park where possible, and four-foot shoulders outside the park without removing or significantly impacting old growth redwood trees" (Caltrans 2011). When this southern segment of U.S. 101 is redesignated as a Terminal Access route, STAA trucks will have uninterrupted access on U.S. 101 from the Oregon border to the San Francisco Golden Gate Bridge.

Caltrans faced legal challenges on the project's CEQA (State) and NEPA (federal) environmental reviews. Caltrans prevailed in the CEQA case (2012). In 2014, Caltrans voluntarily withdrew the Finding of No Significant Impact (FONSI) for its NEPA Environmental Assessment in order to analyze, per the State Appellate Court's findings, certain aspects of the impacts to redwood tree roots. As of (May) 2021, the project is still in litigation.

Transition to Zero-Emission Technology Target: Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize near-zero emission freight vehicles and equipment powered by renewable energy by 2030.
– CA Sustainable Freight Action Plan 2016

The other California Legal Advisory Routes in Humboldt are:

- SR 254 (Phillipsville to Stafford) (30-feet-maximum KPRA Advisory);
- SR 169 (Klamath to Weitchpec) (30-feet-maximum KPRA Advisory);
- SR 96 (Willow Creek to Yreka) (36-feet-maximum KPRA Advisory); and
- SR 36 (Fortuna to Johnstonville) (30-feet-maximum KPRA Advisory).

MARITIME TRANSPORT

Port of Humboldt Bay

California has twelve deep-water seaports that accommodate transoceanic vessels. Eleven are publicly owned and one (Benicia) is privately owned. The Port of Humboldt Bay is the only deep-water shipping port between San Francisco, 225 nautical miles south, and Coos Bay, Oregon, 156 nautical miles north. It is a working port that can handle vessels with domestic or international cargoes, including mid-sized cargo ships (Panamax) vessels, which can transit the Panama Canal locks. However, the Port of Humboldt Bay is currently the major underutilized deep-water harbor in the State. It is the only California port without rail access to the national rail network.

Photo: humboldtbay.org

"Marine terminals on Humboldt Bay are farther from inland markets than most other ports on the West Coast. Combined with a lack of rail infrastructure, this makes it unlikely that Humboldt Bay can attract high-volume marine cargo" (*Humboldt Bay Maritime Industrial Use Market Study-Final Report* (County of Humboldt, 2018).

The Humboldt Bay Harbor, Recreation and Conservation District (Harbor District), a countywide public local agency, manages Humboldt Bay pursuing the combined goals to promote commerce, navigation, fisheries, recreation, and to protect natural resources.

The Harbor District owns Kramer Dock and Redwood Marine Terminal on the Samoa Peninsula, and also owns and operates Woodley Island Marina facility, which is a full-service marina with 237 slips for commercial, recreational, research, and safety vessels. Woodley Island Marina has guest docking facilities, laundry and shower facilities, a restaurant, offices, and other facilities.

The Harbor District has been cleaning up and refurbishing Redwood Marine Terminal II (berth 2), which includes a 1,170-foot-long dock with deep-water access. Upon purchasing the site for $1.00 in 2013, the Harbor District worked with the U.S. Environmental Protection Agency to clean up acids and pulping liquors that were left behind in 2008 by the previous owners, Evergreen Pulp. The District then invested $3 million to upgrade warehouses and office facilities, and held a grand opening ceremony in October 2016. Tenants already operating at the site include businesses in mariculture (clam and oyster seeds), surface shipping, sea salt, and an electrical company.

Port Facilities

The Harbor District maintains six channels in Humboldt Bay, as follows:

Channel	Depth maintained, MLLW[1]
Bar channel	-48 feet
Entrance Channel	-48 feet
North Bay Channel	-38 feet
Eureka Channel - southerly segment	-35 feet
- northerly segment	16 feet
Samoa Channel and turning basin (north)	-38 feet
Fields Landing (Hookton) Channel	-26 feet

[1.] Mean Lower Low Water (MLLW): the average of the lower low water height of each tidal day.

Humboldt Bay channels access seven operating docks and nine deep-water berths. All docks serve ocean-going dry cargo vessels; one dock also serves liquid bulk cargo vessels. The following docks and terminals have active cargo terminals:

"Through careful planning, the District is committed to build the foundation for a real increase in the cargo handling capacity of the bay."
– Humboldt Harbor District website

Eureka/Samoa:
- Redwood Dock Site: Phillips Petroleum (formerly Tosco), Simpson-Samoa
- Dock B/Balloon Track (a Foreign Trade Zone)

Fields Landing:
- Fields Landing Terminal Area (a Foreign Trade Zone)
- Humboldt Bay Forest Products Terminal (Olson Dock)

Table *Goods*-1 gives more information on active shipping terminals serving Humboldt Bay.

Other Harbor Areas

Trinidad Harbor is a small cove on the northern rim of Trinidad Bay, approximately seventeen miles north of the entrance to Humboldt Bay. The Trinidad Pier is the northern-most oceanfront pier in California. Trinidad Harbor is used by commercial and recreational fishing boats and not by cargo vessels. The Trinidad Rancheria purchased the six-acre harbor site and pier in 2001, and in 2012 completed reconstructing the pier.

Shelter Cove is approximately 60 ocean miles south of Humboldt Bay (adjacent to Whitethorn in Southern Humboldt). Boating access to the sea is managed by the Humboldt Bay Harbor Recreation & Conservation District. Boating activities are for fishing and recreation, not freight.

See Figure 11.1 Harbor/Marine Facilities (go to Maps Tab).

Table *Goods-1.* **Active Shipping Terminals on Humboldt Bay**

Location	Shipping Terminal	Ownership	Primary Use
SAMOA PENINSULA (North Bay Channel)	1. Redwood Marine Terminal (Berths 1 & 2)	HBHRCD* (publicly owned)	By mill operators, fishing vessels, cruise boat, land and public dock access, and mariculture
	2.California Redwood Chip Export Dock	California Redwood Co. & Simpson Lumber Co	Bulk woodchips
	3. Fairhaven Business Park Terminal	Security National Properties	Logs, cruise boat
EUREKA WATER-FRONT (North Bay Channel)	4. Pacific Affiliates Dock	Dave Schneider	Multi-purpose utility dock; intermittent berthing of non-cargo vessels including Coast Guard, cruise boat and marine environmental/ safety
	5. Sierra Pacific Industries, Eureka Dock	Sierra Pacific Industries	Multi-purpose forest products dock; inbound log barges, outbound woodchip barges, occasional inbound lumbar barges
	6. Chevron Oil Terminal	Chevron Oil	Bulk refined petroleum products; dedicated to ocean barge every 7 to 8 days
FIELDS LANDING (South Bay)	7. Humboldt Bay Forest Products Terminal	Humboldt Bay Forest Products	

*Humboldt Bay Harbor Recreation and Conservation District. Sources: HBHRCD 2007, www.humboldtbay.org (January 2017)

Port Cargo

Forest products, mostly woodchips, are the Port's main cargo from deepwater ships. Between 1994 and 2016, according to the Humboldt Bay Maritime Industrial Use Market Study (County of Humboldt 2018), woodchips accounted for 90% to 100% of domestic shipments. However, shipping forest products from Humboldt Bay has been declining for decades, in some cases by more than 95%. "No domestic lumber shipments have occurred since 1998," "essentially no lumber exports have occurred since 1995," and "From 2010 through 2016 there were no foreign imports." The Port's main domestic cargo is petroleum products barged in from refineries in the San Francisco Bay area.

The market study pointed out that changes in the ship container industry (e.g., larger ships, larger marine terminals, and consolidation of shipping lines) make smaller ports non-competitive for container freight. The final report states, "it is unlikely that Humboldt Bay will become a container load center due to limits on the size of ship that can transit the navigation channels, the lack of railroad connections, and the limited local population base."

Humboldt Bay imports more than 90% of the gasoline and diesel fuel used in Humboldt County, and approximately 70% used in Del Norte, Trinity and Mendocino Counties.

Commercial fishing is another main industry moving goods in the Humboldt Bay Harbor. Over 200 commercial vessels list Eureka as home port, and approximately 130 commercial fishing vessels berth at the Eureka Public Marina. Over 500 vessels from other West Coast ports use the Harbor facilities annually. The Olson Dock, operated by Humboldt Bay Forest

Products, Inc., is also used for mooring commercial fishing vessels when it is not being used by commercial deep-draft vessels.

The Harbor District's *2003 Harbor Revitalization Plan* identified the Port's competitive advantages as being: waterfront industrial sites; large sites on the Samoa Peninsula with access to the 38-foot channel, relatively low-cost land, labor, and livability. The Plan notes that the most promising opportunities for the Port of Humboldt Bay Harbor include:

- marine-dependent industrial projects;
- niche dry and liquid bulk cargoes (e.g. bulk aggregates and rock to the Northern California construction market); and
- forest products.

Cargo objectives are also included in the Harbor District's *2010 Strategic Plan* and *2007 Humboldt Bay Management Plan*.

National Marine Highway Program

The Marine Highway Program was established by Congress, pursuant to the Energy Independence and Security Act of 2007 (and was expanded with legislation in 2012 and 2016). The program's primary goal is to reduce truck traffic on congested surface roads by diverting domestic freight (or passengers) to marine highway routes between U.S. ports. The marine highways are federally designated, and are named for the congested landside route it parallels, such as marine highways M-5 (parallel to Interstate 5) along the Pacific coast and M-580 (parallel to State Route 580) in California.

The Harbor District has tried to get funding for viability analyses and marketing for short-sea shipping from Humboldt Bay to the M-5 along the coasts of Washington, Oregon, and California. So far, however, the District has not been able to secure funding to cultivate potential markets to show that there is a demand for viable, sustained short-sea shipping.

Table *Goods-2*. **Foreign Trade Zones in Humboldt County**

F.T.Z. Site No.	Location/Description	Ownership
#1 Dock "B"	7-acre site at the public dock B in Eureka.	City of Eureka (inactive)
#2(A)	320-acre site on Samoa Peninsula; land set aside for industrial development.	City of Eureka
#2(B) Redwood Marine Terminal	66-acre site on Samoa Peninsula; existing facilities are predominantly wharves and piers for waterborne commerce.	HBHRCD
Site #3(A) Humboldt Bay Forest Products (Olson Dock)	62-acre site in Fields Landing.	Mr. Stanwood Murphy
Site #3(B) Fields Landing Terminal (Formerly Kramer Dock)	19-acre site in Fields Landing, south of Site #3(A).	HBHRCD
Site #4 Redwood Coast Airport	50 acres of activated F.T.Z. area (within a 247-acre site) at the Redwood Coast Airport.	County of Humboldt

FOREIGN TRADE ZONE

Foreign Trade Zones (F.T.Z.) are areas that are physically within the United States but are considered outside of U.S. Customs' jurisdiction. Thus, a company transporting goods in an F.T.Z. may be able to delay or reduce their duty payments on foreign merchandise, and/or may be exempt from state/local inventory taxes on foreign goods and domestic goods held for export. The Foreign-Trade Zones Board, which grants zone status, is comprised of the U.S. Secretary of Commerce and the U.S. Secretary of the Treasury.

Humboldt County has a designated Foreign Trade Zone (No. 248), which is sponsored by the City of Eureka. The zone is comprised of four designated sites, three around Humboldt Bay and one at the Redwood Coast Airport.

RAIL TRANSPORT

"As developable land is scarce and sold at a premium, abandoned rail lines and adjacent right-of-way offer one way to accommodate the need for passenger rail service, nonmotorized transport, and recreational services."
– California State Rail Plan 2013

The Northwestern Pacific (NWP) Railroad was acquired by the North Coast Railroad Authority (NCRA) through State and federal funds. The NWP's Eel River Division of rail lines north of Willits was purchased with State funds in 1992. The Russian River Division line south of Willits was purchased with federal funds in 1996. The NWP Railroad line, which formerly served Humboldt Bay, ceased service in 1998, when the NWP Eel River Division line washed out at several points in the Eel River Canyon. The Federal Railroad Administration ordered the NCRA to cease railroad operations on portions of the line until safety repairs were made (Emergency Order No. 21).

There have been significant changes regarding the NCRA, led by Senate Bill 1029 (McGuire, 2018). SB 1029 directed NCRA to transition its purpose to assessing the feasibility of preserving the railroad right-of-way into a 320-mile Great Redwood Trail. Senator McGuire's companion legislation SB 69 passed in September 2021, legislates renaming the North Coast Railroad Authority the Great Redwood Trail Agency on March 1, 2022. This successor agency has the full suite of powers necessary to carry out construction and operation of the trail. The CTC has authorized the NCRA to transfer all real property, the freight contract, and the freight easement for all right-of-way south of MP 89 at the Sonoma-Mendocino County line, and to railbank all right-of-way north of MP 142.5 at Outpost (just north of Willits).
The near-term future of the NCRA railroad right-of-way in Humboldt County is to preserve the public asset by railbanking, and convert it to active transportation use until the time comes to reinstate rail use. (Read more in the Commuter Trails Element.)

AVIATION TRANSPORT

Aviation's contribution to climate change – 3.5% of warming, or 2.5% of CO_2 emissions – is often less than people think. It's currently a relatively small chunk of emissions compared to other sectors. The key challenge is that it is particularly hard to decarbonize (aviation). We don't yet have the technologies to decarbonize air travel.

- Our World Data 2020

Because of its capacity for speed and distance, air transport significantly increases mobility for moving goods and passengers. Air freight is transported in dedicated cargo aircraft or in the cargo compartments of passenger aircraft (called "belly freight").

Humboldt's regional aviation system provides services for scheduled commercial flights, freight and air couriers, air ambulance, air charter, private pilots, law enforcement, and emergency response/operations.

There are nine public use airports in Humboldt County. The County of Humboldt owns six of the public airports; the Aviation and Airport Division of the County Public Works Department manages all six:

- Redwood Coast Airport (located in McKinleyville; also known as Arcata/Eureka Airport)
- Dinsmore Airport
- Garberville Airport
- Kneeland Airport
- Murray Field Airport (located in Eureka)
- Rohnerville Airport

The other three airports are:

- Samoa Field Airport (formerly called Eureka Municipal), owned and managed by the City of Eureka;
- Hoopa Airport, owned and managed by the Hoopa Tribe; and
- Shelter Cove Airport, owned and managed by the Resort Improvement District #1.

The Redwood Coast Airport is the region's sole commercial airport, meaning it is the only airport that offers scheduled (daily) passenger flights. It is served by three commercial passenger airlines. United Airlines offers flights to San Francisco and Denver; the new Avelo Airlines offers flights to Hollywood/Burbank; and American Airlines offers flights to Phoenix. The airport is also used by cargo (package delivery) companies; current companies are Federal Express, United Parcel Service, AmeriFlight, and Union Flight. Murray Field, a general aviation airport, also serves air freight. Federal Express, United Parcel Service (UPS), and AmeriFlight have been operating at Murray Field for approximately fifteen years.

See the Aviation System Element (and Figure 10.1 in the Maps Tab) for more information on Humboldt County public airports.

GOAL, OBJECTIVES, & POLICIES

The goal, policies, and objectives for the region's goods-movement system align with the RTP's overall goal and objectives. Furthermore, these goal and objectives are intended to also advance the vision to decarbonize California's freight transport system. Governor Brown articulated the need, in Executive Order B-32-15, for California to accelerate actions to transition to a more efficient, more economically competitive and less polluting freight transport system. HCAOG shares the States goal for its statewide system for the regional system: to focus on making the *existing* freight system more efficient through technology and other means.

GOAL: Goods move in and out of Humboldt County efficiently, predictably, and cost-effectively via an intermodal transport system. The system moves passengers and goods in a manner that is economically sustainable and environmentally compatible.

Objectives: The policies listed in the Goods Movement Element will help meet the RTP's main objectives (listed in alphabetical order). The Goods Movement policies below are grouped according to the RTP's main objectives.[1] The objectives support and work in tandem with one another; a policy can help meet more than one objective.

The tree symbol indicates objectives that are GHG performance measures (see Chapter 2 for all GHG performance measures and targets.)

MAIN OBJECTIVES:	GOODS MOVEMENT SUB-OBJECTIVES & POLICIES
Active Transportation Mode Share/ Complete Streets	◆ Improve goods mobility, reliability, and system efficiency in and out of Humboldt County. Connect road, sea, air, and rail transport modes and maximize the utility of each mode. ◆ Improve connectivity and balanced growth of the goods movement system. **Policy GM-1. (Intermodal)** HCAOG shall promote multiple uses of transportation corridors and strategic use of intermodal transfer facilities. **Policy GM-2. (Intermodal)** HCAOG shall encourage and support safe, multimodal accessibility at Humboldt's public use airports and seaports. **Policy GM-3. (Road/Trucking)** HCAOG prioritizes projects to design and maintain truck routes consistent with Complete Streets goals whenever safe and feasible.
Economic Vitality	**Policy GM-4. (Maritime)** HCAOG will support the Humboldt Bay Harbor, Recreation and Conservation District's efforts to develop a fully operational, sustainable, and environmentally compatible maritime transportation system as consistent with the Harbor District's mission. **Policy GM-5. (Aviation)** HCAOG shall help promote fully and efficiently utilizing air freight capabilities in Humboldt County, and shall support increasing regional aviation resources for intermodal goods movement, as compatible with multimodal and GHG emission-reduction goals.

[1] Chapter 2 fully describes the six main objectives.

	Policy GM-6. (Rail Right-of-Way) HCAOG encourages the highest and best use of rail facilities and rail rights-of-way in Humboldt County. HCAOG supports railbanking and preserving the Northwestern Pacific railroad rights-of-way until it is economically viable and environmentally compatible to restore freight or passenger rail service. HCAOG supports efforts to plan, design, construct, operate, and maintain a trail in, or next to, the rail rights-of-way, consistent with Senate Bills 1029 and 69 (McGuire) to develop the Great Redwood Trail.
Efficient & Viable Transportation System	◆ Invest in and maintain facilities and technologies to increase the efficiency and cost-effectiveness of the region's goods movement system. ◆ Use innovative technology and practices to operate, maintain, and optimize the efficiency of the freight transportation system while reducing its environmental and community impacts. {California Freight Mobility Plan} ◆ Improve the state of good repair of the freight transportation system. {California Freight Mobility Plan} ◆ Advance EV charging and fueling infrastructure to meet Safe & Sustainable Transportation targets of *VROOM 2022-2042*. ◆ Hydrogen fuel is available for fleet vehicles, with green hydrogen fuel available as much and as soon as possible to enable intra-county and inter-county travel. **Policy GM-7. (Road/Trucking)** HCAOG supports the County's use of commercial truck weight fees and timber taxes as sources to pay for maintaining local truck routes in a state of good repair. HCAOG shall support efforts to cooperatively develop and implement equitable cost-share fee programs for the trucking industry. **Policy GM-8. Energy-Wise Freight & Transport:** HCAOG shall promote projects and programs that increase energy efficiency, conserve energy, and use alternative ("clean") energy sources to transition to a carbon-neutral transportation system and reduce the direct and indirect costs of freight and passenger transportation.
Environmental Stewardship & Climate Protection	◆ Reduce overall energy use in the goods movement system. ◆ Reduce air pollutant emissions and air quality impacts of the regional goods movement system. ◆ Invest strategically to accelerate the transition to zero- and near-zero-emission equipment powered by renewable energy sources, including investing in supportive infrastructure. (California Sustainable Freight Action Plan 2016) ◆ Reduce on-road transportation-related fossil fuel consumption in Humboldt County. **Policy GM-9. (Goods Movement)** HCAOG shall work with NCUAQMD and other stakeholders to develop and promote programs, technologies, and best practices to reduce the transportation sector's air pollutant emissions (e.g., NOx, PM, SOx, sulfate, VOC) and to decarbonize California's freight transport system. {*California Sustainable Freight Action Plan 2016}*

	Policy GM-10. (Zero Emission Vehicles): HCAOG will work with the freight industry to encourage and help accelerate the widespread transition to zero-emission technologies and infrastructure (CAPTI 2021).
Equitable & Sustainable Use of Resources	◆ Preserve harbor-related land uses that serve Humboldt Bay. **Policy GM-11. (Goods Movement)** HCAOG shall promote applying innovative and green technology, along with accompanying infrastructure and applicable practices, to optimize the efficiency of the freight transportation system. {*California Sustainable Freight Action Plan 2016}* **Policy GM-12. (Maritime)** HCAOG will assist local, regional, or state lead agencies in preserving coastal-dependent land uses as necessary for successfully operating the regional maritime transport system to meet demands for its highest and best use.
Safety & Health	◆ Reduce the regional goods movement transportation system's number of accidents, injuries, unsafe conditions, and security threats. ◆ Improve the safety, security, and resilience of the freight transportation system. {California Freight Mobility Plan} **Policy GM-13. (Goods Movement)** HCAOG shall collaborate with State, local, and Tribal agencies to help reduce and eliminate health, safety, and quality-of-life impacts on communities that are disproportionately affected by operations at major freight corridors and facilities. This includes reducing toxic hot spots from freight sources and facilities, and ensuring continued net reductions in regional freight pollution. {*California Sustainable Freight Action Plan 2016}*

NEEDS ASSESSMENT

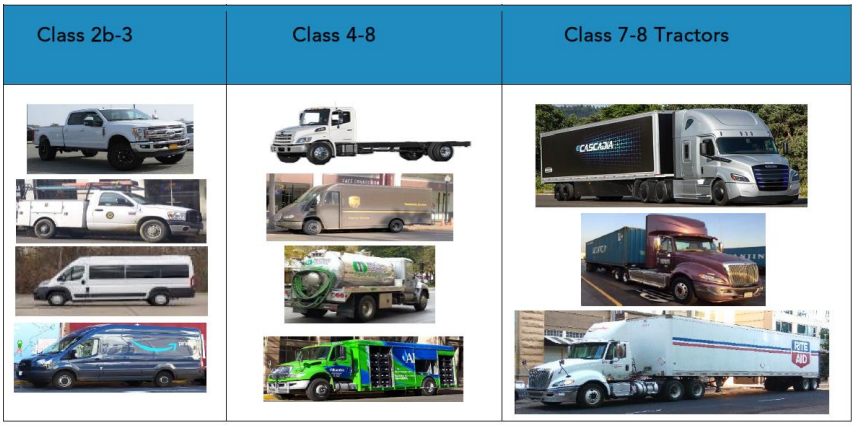
INTERMODAL TRANSPORT NEEDS

> Vision for a sustainable freight transport system
> Transporting freight reliably and efficiently by zero emission equipment everywhere feasible, and near-zero emission equipment powered by clean, low-carbon renewable fuels everywhere else.
> *– CA Sustainable Freight Action Plan 2016*

In Humboldt County, all four "legs" of intermodal freight transport (highway, maritime, aviation, rail) face common challenges. Foremost among them is that Humboldt's small population and economic base generate small markets for imports or exports, which makes it hard to pay for maintaining costly infrastructure. Each mode also suffers from deteriorating infrastructure and equipment that needs modernizing. The region's rugged terrain and remoteness add to infrastructure costs, as well as make it more expensive to transport goods in and out of Humboldt County than in and out of competing markets. Since Humboldt currently has no rail freight service, our optimal freight transport system will be based on connecting trucking, port, and aviation facilities.

The following discusses regional needs for developing a more intermodal, more efficient, and more cost-effective goods-movement system in Humboldt County.

Vehicles Subject to the Advanced Clean Trucks Regulation



Advanced Clean Trucks Regulation (CARB, February 12, 2021)

TRUCKING FLEET NEEDS

The California Air Resources Board (CARB) passed the Advanced Clean Trucks Regulation[2] with the purpose to reduce air pollution and greenhouse gas (GHG) emissions from medium- and heavy-duty on-road vehicles. CARB is enacting strategies to accelerate a large-scale transition to zero-emission vehicle fleets. The regulation requires manufacturers to sell zero-emission trucks and buses as an increasing percentage of their annual California sales from 2024 to 2035. CARB's timeline is to set regulation for medium and heavy-duty zero-emission fleets at the end of 2021.

HIGHWAY TRANSPORT NEEDS

Because the highways and local roads currently accommodate all goods movement through Humboldt County, improving the State highway system is a primary need for improving goods movement in Humboldt County.

Truck restrictions (due to terrain) on U.S. 101 make shipping by truck less competitive. This, in turn, makes the port less competitive, and in some cases makes aviation shipping less competitive, as well. The local trucking industry's competitive edge applies to the relatively small area south of Medford and Klamath Falls, Oregon, west of Redding, and north of Willits. Outside that area, truck shipping rates are generally lower to competing markets and ports (HBHCRD 2003).

State Route 299

One need for making truck and port transport more competitive is to reduce truck travel times between the Humboldt Bay Area and Redding (in Shasta County). In November, 2016, Caltrans completed an inter-regional

[2] Advanced Clean Trucks Regulation, CCR Section 1963 (June 2020). ww3.arb.ca.gov/regact/2019/act2019/fro2.pdf)

project to make the Buckhorn Grade portion of State Route 299 safer and more efficient travel for people driving passenger cars, recreational vehicles, and commercial trucks.

Caltrans widened and/or realigned 9.6 miles of SR 299 in Trinity and Shasta Counties to eliminate seven turns, realign hairpin turns, and add truck-passing lanes. Due to the reconstruction, STAA trucks (semi-trucks longer than 48 feet) can use SR 299 to connect from Interstate 5 at Redding to Highway 101 and the Port of Humboldt. The total project cost approximately $60 million; most of the funds came from Caltrans' State Highway Operation and Protection Program (SHOPP).

U.S. Highway 101

U.S. 101 is the backbone for intercity and intercounty goods movement throughout Humboldt County, as even sea cargo and air cargo rely on surface transportation via trucking. As discussed above, STAA trucks will be able to travel north-south to Humboldt when Caltrans District 1's Richardson Grove project is completed, and they will have east-west access to Interstate 5 once S.R. 299 is designated a Terminal Access route (possible now that Caltrans District 2's Buckhorn Grade is completed).

Overall, U.S. 101 within Humboldt functions well for goods movement; no segments suffer severe congestion. U.S. 101 is congested during peak travel hours in Eureka, where the highway functions as the city's main street. Due to this roadway's mixed use, freight trucks—particularly heavy timber industry trucks, can cause incompatible noise and vibration, as well as hazardous conditions for pedestrians and crossing traffic.

Environmental conditions are impacting current and future access and reliability on U.S. 101 both intra- and intercounty. U.S. 101 around Humboldt Bay is increasingly vulnerable to tidal inundation from sea-level rise and flooding, which poses potential threats to predictability and timely delivery of goods. In Del Norte County, coastal erosion and geological movement along the four-mile segment of Last Chance Grade (between Klamath and Crescent City) has caused landslides and road failures for decades. Caltrans District 1's goal is to realign the route; however, building the alternative route is estimated to take 15 years for environmental studies, permitting, and design, and another five to eight years to construct (to year 2039).

To the south, U.S. 101 in Mendocino County is subject to landslides and rockslides. The historic landslide at Confusion Hill finally compelled Caltrans to realign the highway (with two new bridges) to the other side of the South Fork Eel River (completed in 2009). Rockslides on State Route 1 and U.S. 101 can restrict surface access into/out of Humboldt County to State Routes 36 and 299. Traffic bottlenecks on 101 at Willits (Mendocino County) led Caltrans to build the Willits Bypass, which opened in November 2016.

Broadband Connectivity

Equal access to broadband is important because an increasing amount of services, such as medical appointments, can be done remotely online. Humboldt County is located within the Redwood Coast Consortia (RCCC) region, as identified in the California Regional Broadband Consortia's *Recommended Strategic Broadband Corridors* report (2019). The report identifies Highway 101 through Humboldt as a strategic broadband corridor where it would interconnect with existing fiber on the CA 36 corridor and CA 299 fiber corridor currently being implemented. Both these routes go east to interconnect with fiber on I-5. As part of its "Dig-Once" policy, Caltrans aims to install conduit in conjunction with transportation projects.

Trucking Industry Cost-Share

The heavier the vehicle, the more strain it will put on a roadway's structure. Freight trucks, loaded and unloaded, weigh more than other road vehicles; thus, they more rapidly and more severely deteriorate roadways. The heavy trucking weights and volumes in Humboldt are predominantly from timber, livestock, and quarry rock. Because truck transport is, and will continue to be, the primary method of goods movement in Humboldt County, stakeholders in the trucking industry are integral for proactively solving how to finance maintaining the region's truck routes in a state of good repair. Local jurisdictions are interested in having the trucking industry share equitably in the costs and benefits of road repair and maintenance.

Cooperative efforts are needed between the trucking industry, Humboldt County, and Caltrans to assess the impacts that trucks have on the roadway network, and to create regulatory guidelines for truck travel, including designated truck routes. Trucks should not be permitted on facilities that are not designed or constructed for heavy vehicles if there are alternatives.

Transporting heavy forest products causes the most wear and tear on the region's roadway system. Many county roads that provide access between the forest (point of harvest) and the state highway are not designed for heavy truckloads. Many existing roads and bridges require additional structural support to handle the heavy loads. The County and Cities expend significant transportation funds to repair and maintain roadways used by timber trucks. For example, the estimated cost to maintain and repair the roads used during a sustained logging operation was calculated at $9,000 per mile annually in 2002 (Humboldt County 2002); with inflation, that cost would be approximately $12,500 per mile today.

The U.S.D.A. Forest Service transfers some funds to the County from the sale of National Forest timber. The rest of the funds for road maintenance come primarily from a county road tax on property in unincorporated areas, in-lieu taxes, and traffic fines. Like jurisdictions throughout California, the County of Humboldt does not have enough funds annually to routinely maintain its roads. To make the costs and benefits of road maintenance more equitable, additional funds from increased weight fees and additional timber taxes are needed.

MARITIME TRANSPORT NEEDS

Humboldt Bay Harbor's transportation competitiveness is limited by economic and geographic conditions that do not constrain competing ports. How well the Humboldt Bay Port competes with other port facilities for marine transport depends on:

- distance to the origin/destination of the shipped commodity
- port connections to freight trucking and freight rail
- sufficient cargo volumes to spread fixed shipping costs
- adequate dockside cargo facilities

To grow its cargo handling activities, the major competitive disadvantages the Port faces are that:

- the local market is small;
- the port is far from large metropolitan markets;
- the port's connections to inland areas by truck transportation are limited ; and
- the odds are low for restoring NCRA freight rail north of Willits given the environmental constraints within Eel River Canyon in Mendocino County.

Other "port issues" are

- Economic impacts from non-indigenous species
- Navigation hazards due to sediment deposits (shoaling) from Eel River
- Shoaling, sedimentation, and deferred dredging constrain deepwater shipping
- Cargo handling facilities are in disrepair (Caltrans 2016)

The Harbor District developed the *Port of Humboldt Bay Harbor Revitalization Plan* "aimed at establishing a new and sustainable maritime focus for the community." The Plan identifies "revitalization strategies" that would fit best with market demand and the Port's competitive advantages. Under conditions with no rail, a strategy for goods movement activities is to develop coastal feeder barge service as an alternative to rail. Goods movement strategies recommended either with or without rail service are: niche bulk cargoes, forest products cargo handling, and marine-dependent industrial projects (HBHRCD 2003).

The District's Revitalization Plan recommends sites on Humboldt Bay for the following freight-related markets:

Marine Use	Recommended Sites
Bulk Aggregates/Rock	– Fields Landing Terminal (southern origin) – Simpson Samoa Pulp Mill Dock (northern origin)
Liquid Bulks	– Simpson Samoa Pulp Mill Dock – Simpson Property/Fairhaven Terminal – Chevron Dock
Coastal Lumber Barge Service	– Eureka Forest Products/Sierra Pacific (open storage) – Fairhaven Terminal (covered storage) – Redwood Docks 1 & 2
Forest Products Cargo Handling	– Eureka Forest/Sierra Pacific (chips, logs lumber) – Fairhaven Terminal (pulp, plywood, veneer) – Humboldt Bay Forest Products (logs, lumber) – Samoa-Pacific Chip Export dock (chips) – Redwood Docks 1 & 2

The *Samoa Industrial Waterfront Preliminary Transportation Access Plan* (HBHRCD 2013a) addresses needs and opportunities for the Harbor District regarding harbor-related activity on the Samoa Peninsula. The plan recommends a "Preferred Alternative Route," by which the Harbor District could optimize intermodal goods movement between the bay and land. The plan identifies seven roadways in Samoa that are substandard for serving as intermodal freight routes (i.e., Major Collector roadway status). Three of the roadways are in the County's jurisdiction:

- New Navy Base Road – Bay Street to Highway 255;
- Bay Street – New Navy Base Road to Vance Avenue; and
- Samoa Pulp Lane (aka LP Drive) – New Navy Base Road to Vance Avenue.

The other four roads are currently privately-owned:

- Vance Avenue – Bay Street to Samoa Pulp Lane;
- Vance Avenue – Samoa Pulp Lane to north spur;
- North Spur off Vance Avenue; and
- South Spur off Vance Avenue.

To implement the "Preferred Alternative Route," the plan advises the Harbor District to acquire rights-of-way or easements to the four privately-owned road segments. The plan also recommends adding the seven road segments, as well as the portion of Highway 255 from New Navy Base Road to Highway 101 in Eureka, to the National Highway System.

The 2018 Market Study mentioned earlier states that the "industries most likely to show growth in demand for land zoned for (Coastal Dependent-Industrial) property are local marine cargo, commercial fishing, mariculture, marine research, and recreational boating" (County of Humboldt, 2018).

New Navy Base Road

One additional project that will facilitate intermodal goods movement is Humboldt County's roadway project for New Navy Base Road. This project is listed in the RTP's Complete Streets Element (Table *Streets-5*, HCAOG Top Priority Regional Complete Streets Projects) and not below. The County's project is to reconstruct New Navy Base Road from State Route 255 to Bay Street. The project is long-term (implementation year is TBD), not funded, and estimated to cost $1.5 million. This project will improve harbor-truck connections for marine terminals in Samoa. The Harbor District estimates that "minor physical changes to serve marine terminals" would cost $416,000 (2017 dollars).

In early 2021, the Harbor District contracted services to develop a conceptual master plan and analyze opportunities and constraints for properties zoned coastal-dependent Industrial between the Samoa Bridge and the former pulp mill (Redwood Marine Terminal II). One of the Harbor District's long-planned goals is to develop a modern multi-purpose berth and land-based facility expand at Redwood Marine Terminal I (RMT I) on Humboldt Bay (Harbor District, Board Meeting Agenda for February 11, 2021).

AVIATION TRANSPORT NEEDS

Businesses and individuals in our region want access to dependable, convenient, and affordable air transport, both for freight and commercial passenger airline service. Expanding regional aviation service capacity would help build regional economic potential and would help maintain an important quality-of-life amenity in this rural area.

The County of Humboldt has expressed the need to expand airline services (commercial passenger and freight), for example, in the *General Plan Update* (Circulation Element Policy C-P44, and Economic Development Element Policy ED-P12, January 3, 2017) and in "Redwood Coast Targets of Opportunity 2012" (County of Humboldt, 2013). The County Board of Supervisors, in 2017, contracted Voltaire Aviation Consulting to perform an "Airport Governance and Sustainability Study." Part of the study is to recommend marketing the commercial airport. The goal is to support economic growth by "developing and sustaining a solid air transportation network that includes increased airline passenger and air cargo service, business/corporate aviation access,…and aviation-dependent industries…" (Humboldt County 2017).

The Redwood Coast Airport and Murray Field Airport move (i.e., enplane and deplane) the most tons of air cargo in the region. Murray Field is a relatively small airport that can only accommodate smaller planes, which means some air cargo volumes are moved less efficiently. If air freight facilities were expanded at the Redwood Coast Airport, larger cargo planes could potentially reduce airfreight costs through more efficient economies of scale. Expanding the airport's airfreight capacity could potentially shift some of the region's goods movement from trucking to air. For example, perishable products (e.g. aquaculture, high-value food, flowers) that are now trucked from Humboldt to the San Francisco International Airport could instead be flown out from the local airport. However, according to a feasibility study prepared for the Aviation and Airport Division of the County Public Works Department, under current conditions, expanding Redwood Coast Airport's air freight facility would not be economically practical.

ACTION PLAN: PROPOSED PROJECTS

GOODS MOVEMENT

Table *Goods-3* lists projects or improvements that HCAOG supports to help achieve the RTP's goals and objectives for the region's goods movement transportation system.

Table *Goods-3*. **Regional Goods-Movement Projects**

Lead Agency	Project Name	Short or Long Term[1]	Description	Funding Source	Implementation Year(s)	Estimated Cost ($000)
Harbor District	Port Infrastructure Development Program	LT	Establish a multipurpose, heavy-lift, publicly-owned Redwood Marine Terminal to support emerging offshore wind industry.	CA Energy Commission ($11M), Headwaters Fund, federal grants	unknown	$124,000
Harbor District	Vance Avenue – Bay Street to Samoa Pulp Lane	LT	Acquire title to property; improve to Major Collector and National Highway System (NHS) standards to serve marine terminals.	Not funded	unknown	$2,336
Harbor District	Vance Avenue – Samoa Pulp Lane to North Spur	LT	Acquire title to property; improve to Major Collector and NHS standards to serve marine terminals.	Not funded	unknown	$1,094
Harbor District	North Spur off Vance Ave	LT	Acquire title to property; improve to Major Collector and NHS standards to serve marine terminals.	Not funded	unknown	$746
Harbor District	South Spur off Vance Ave	LT	Acquire title to property; improve to Major Collector and NHS standards to serve marine terminals.	Not funded	unknown	$1,033
Harbor District	Humboldt Bay Navigation Channel Shoaling Study	LT	Project seeks to reduce shoaling in Humboldt Bay to insure year-round deep draft cargo shipping and bar safety for all users.	Not funded (50% cost share)	unknown	$3,000
Humboldt County	Bay Street – New Navy Base Road to Vance Ave	LT	Improve to Major Collector and NHS standards to serve marine terminals.	Not funded	unknown	$978
Humboldt County	Samoa Pulp Lane – New Navy Base Road to Vance Ave	LT	Improve to Major Collector and NHS standards to serve marine terminals.	Not funded	unknown	$239
Humboldt County	New Navy Base Road – State Route 255 to Bay St.	LT	Improve to NHS standards to serve marine terminals.	Not funded	unknown	$1,929
Caltrans District 1	Richardson Grove Operational Improvement Project	LT	Road widening	2011 SHOPP	unknown	$5,500
				Short-term Subtotal		$0
				Long-term Subtotal		$140,855
				Regional Projects–Funded (constrained) **Subtotal**		$ 5,500
				Regional Projects–Not funded (unconstrained) **Subtotal**		$135,355
				REGIONAL GOODS MOVEMENT PROJECTS TOTAL		**$140,855**

[1] Short-term is 0-10 years; long-term is 11-20 years. Projects with unknown implementation years are listed as long-term.

SYSTEM PERFORMANCE INDICATORS

The table below lists performance indicators for the region's aviation system. The table groups performance measures by "goal," which correspond to the RTP's six main objectives/planning priorities.

Table *Goods-4.* **Performance Indicators for Regional Goods Movement System**

GOALS	FACTORS	INDICATORS	MEASURES	DATA SOURCES
Safety	Collision rates	Do rates of freight-transportation-related collisions exceed statewide averages? Have rates of freight-transportation-related crashes, fatalities, and injuries decreased?	• Collisions per vehicle (or passenger) miles traveled. • Highway crash rates per million vehicle miles for large trucks. • Severity of collisions and injuries. • Number of safety improvement projects implemented.	Accident statistics collected by Caltrans District 1 Safety Division, CHP, local agencies.
	Airport hazards	Are airport tarmac areas and fueling facilities securely fenced? Are there secure boundaries for airport runways, taxiways, aprons?	• Area of unsecure fencing at airport perimeters, card access, gate monitoring system.	Airport Master Plans or safety reports, Caltrans Office of Aviation Planning, Division of Aeronautics.
Balanced Mode Shares (Complete Streets)	Mobility, Reliability	Have multi-modal delivery options increased in the region? Are truck drivers using available truck routes thereby decreasing modal conflicts on alternate local roads?	• Travel mode split (shares) for freight transport. •	Goods movement industry.
Efficient, Viable Transportation System	System condition, System preservation, State of good repair	Has condition of highways and major arterial roadways improved (weighted average countywide)? Do road, aviation, and maritime facilities meet standards for state of good repair?	• Pavement Condition Index (PCI) rating. • Condition of bridges, harbor and aviation facilities. • Maintenance/rehabilitation funding shortfalls.	Public Works Depts, Caltrans District 1, Harbor District, goods movement industry, StreetSaver or other pavement management software (PMS).
	Cost effectiveness of investments, Benefits to costs ratio	Are investments in RTIP projects helping achieve RTP goals? Have investments improved system efficiency and/or productivity? Are truck, harbor, aviation, or rail market shares increasing for commercial passenger/freight services?	Per one thousand dollars invested: • Decreased collisions and fatalities. • Decrease in system-operating cost. • Decrease in air pollution emissions. • Increase in annual freight tons per mile or commercial passenger miles carried.	Caltrans, California Air Resources Board (CARB), CHP, Public Works Depts, local and state environmental compliance reporting.

GOALS	FACTORS	INDICATORS	MEASURES	DATA SOURCES
Environmental Stewardship & Climate Protection (CO_2 reduction)	Fuel and energy use	Has freight-transportation fuel consumption decreased?	• Fuel consumption gallons per capita. • Ratio of fossil fuel use to freight miles traveled.	CARB, state reporting.
	Adaptability and resilience to climate change impacts	Have freight-transportation-related CO_2 emissions decreased? Has the percentage increased for ZEV freight vehicles replacing internal combustion freight vehicles?	• Total freight-related transportation CO_2 per capita and overall (countywide). • Air quality levels	CARB's EMissions FACtors model (EMFAC), environmental and compliance reporting.
Equitable & Sustainable Use of Resources	Equity, Environmental justice	Have freight transportation investments advanced environmental justice (EJ) objectives?	• Percentage of RTP/RTIP expenditures in environmental justice tracts.	
	Transportation coordinated with land use	Are land uses and development compatible for adjacent transportation facilities?	• Acres of sensitive lands and under-invested/disadvantaged communities on which freight transportation infrastructure is built. •	General Plan updates, Airport Land Use Compatibility Plan, Airport Master Plans.
Economic Vitality	Economic sustainability	Have freight transportation investments contributed to economic growth?	• Direct and indirect economic benefits from increased multi-modal options?	

REFERENCES

CITATIONS

California Regional Broadband Consortia 2019 Recommended Strategic Broadband Corridors (December 2019) (https://calcog.org/wp-content/uploads/2020/10/CA-Regional-Broadband-Consortia-Recommended-Strategic-Broadband-Corridors-12-31-2019.pdf, accessed December 20, 2021).

Caltrans 2009 Buckhorn Grade Improvement Project, Final Environmental Impact Report/ *Environmental Assessment* (August 2009) (www.dot.ca.gov/dist3/departments/envinternet/Buckhorn/BGI%20FED%20Aug 5%20TINA.pdf, accessed May 10, 2013)

Caltrans 2011 "The Facts about the Richardson Grove Operational Improvement Project." (March 2011) (www.dot.ca.gov/dist1/d1projects/richardson_grove/the_facts_3-2011.pdf, accessed April 30, 2013)

Caltrans 2015 California Freight Mobility Plan. (December 2015)

Caltrans 2016 "Freight Planning Fact Sheet: Caltrans District 1 – Eureka." (July 2016.) (www.dot.ca.gov/hq/tpp/offices/ogm/factsheets/districts/factsheets_2016/D1_Factsheet_072616.pdf).

Caltrans et al 2016 Caltrans, Air Resources Board, California Energy Commission, and the Governor's Office of Business and Economic Development. *California Sustainable Freight Action Plan* (July 2016)

County of Humboldt 2013 Redwood Coast Targets of Opportunity 2012, Final Report: Part V of the Comprehensive Economic Development Strategy 2013-2018. Authors: Jacqueline Debets and Dennis Mullins. (March 26, 2013)

County of Humboldt 2018 *Humboldt Bay Maritime Industrial Use Market Study–Final Report.* Prepared for County of Humboldt Planning and Building Department-Advance Planning Division by BST Associates. (May 31, 2018)

HBHRCD 2003 (Humboldt Bay Harbor, Recreation and Conservation District.) *Port of Humboldt Bay Harbor Revitalization Plan Final Report*. Prepared for HBHRCD by PB Ports & Marine, Inc. et al.

HBHRCD 2007 Strategic Plan 2007-11.

HBHRCD 2007 Humboldt Bay Management Plan. (May 2007)

HBHRCD 2013a Samoa Industrial Waterfront Preliminary Transportation Access Plan (Administrative Draft). Prepared for HBHRCD by LACO Associates. (June 2013)

HBHRCD 2013b "Humboldt Bay Rail Concept Level Construction and Revenue Analysis-Draft" prepared for HBHRCD by BST Associates and Burgel Rail Group. (July 17, 2013)

Humboldt County 2017 "Help Enhance the Future of Air Service in Arcata/Eureka" *Open Humboldt* webpage, http://humboldtgov.org/1316/, accessed August 31, 2017.

Our World Data, 2020 "Climate change and flying: what share of global CO2 emissions come from aviation?" by Hannah Ritchie. October 22, 2020 (https://ourworldindata.org/co2-emissions-from-aviation, accessed May 10, 2021)

RESOURCES

California Business, Transportation and Housing Agency and the California Environmental Protection Agency 2005 *Goods Movement Action Plan, Phase I: Foundations*. (September 2005) and *Phase II*. (January 11, 2007)

Caltrans 2013 *California State Rail Plan*. Prepared for the California Department of Transportation–Division of Rail by AECOM (Oakland, CA). (May 2013)

County of Humboldt 2013 Prosperity! 2012: Comprehensive Economic Development Strategy, Humboldt County (March 26, 2013)

NADO 2012 (National Association of Development Organizations Research Foundation)–Center for Transportation Advancement and Regional Development. *Freight Transportation and Economic Development: Planning for the Panama Canal Expansion*. Authored by Carrie Kissel (NADO Associate Director), Claire Gron, and Allison Heck. (February, 2012)