

Agenda

Hermosa Advisory Panel Meeting #12 Wednesday, April 20, 12p-2p

Wild Horse Inn - 309 W McKeown Ave, Patagonia

- 11:00 Water issues and concerns review/Q&A with Dr. Ty Ferre (optional)
- 12:00 Review Agenda
- 12:05 Acceptance/Amendments to Meeting Minutes (March)
- 12:10 Panelists: Report Updates
- Linda Shore, *The Nature-Based Restorative Economy in Santa Cruz County, Arizona*
 - Patagonia Area Resource Alliance
 - The Nature Conservancy
- 12:20 Workforce Development Alignment: Dr. Robin Breault, Lead Local
- 1:05 Dewatering Roadmap: Dr. Ty Ferre, Distinguished Professor, Hydrology and Atmospheric Sciences and Tomas Goode, Principal Hydrologist, South32
- 2:00 Wrap Up and Looking Ahead: April 20 meeting
- Consultant progress/panel role in Social Impact Opportunity Assessment, Local Procurement
 - Purple sheet reflection/evaluation

Hermosa Advisory Panel Meeting #12

Wednesday, April 20, 12p-2p

Wild Horse Inn - 309 W McKeown Ave, Patagonia

The meeting of the Hermosa Advisory Panel was called to order at 12:00 pm on April 20, 2022, at the Wild Horse Inn on 309 W McKeown Ave, Patagonia by Angie Donelson.

Meeting was convened after an informal Q&A with Dr. Ty Ferre from 11-12am.

Attendance

- Meeting Facilitators: Angie Donelson, Robin Breault
- South 32 Hermosa Advisory Panel Members: Carolyn Shafer, Chris Young, Damian Rawoot, Fritz Sawyer, Guillermo Valencia, John Fanning, Linda Shore, Marcelino Varona, Maritza Cervantes, Michael Young, Olivia Ainza-Kramer, Ruth Ann LeFebvre
- South32 Hermosa Advisory Panel Members Absent: Gerry Isaac, Liz Collier
- South32: Melanie Lawson, Tomas Goode
- Scribe: Lizbeth Perez

12:00 Dewatering Roadmap: Dr. Ty Ferre, Distinguished Professor, Hydrology and Atmospheric Sciences and Tomas Goode, Principal Hydrologist, South32

- Continued discussion with Dr. Ty Ferre, following informal Q&A with Dr. Ty Ferre from 11-12am. Panel members discussed questions that are important to them to consider in modeling projections:
- Carolyn Shafer: The mine is located in an area with highly fractured geology. If tunnels will be filled with paste backfill as planned when the mining operation is closed, I believe there will be impact on timing of recharge and whether recharge can happen. It may dry out the area.
- Ty Ferre: Difficult to say. Zooming out at a larger scale, we may not see much of an impact of the individual fractures that are filled.
- Carolyn Shafer: Paste backfill will have impact on plants and wildlife and how water flows. It should be in the model.
- Ty Ferre: That is a good question. Please include it in your list of concerns. Don't know the model is place to answer that question, but we can try to address.
- Marcelino Varona: Define paste backfill.
- Tomas Goode: Tailing material (waste of the mining process) is mixed with cement and put back in as a wet material; additional constituents can be added to that to neutralize acid generation.

- Carolyn Shafer: These are massive tunnels that would be filled – what are the size?
- Tomas Goode: Can't speak for full length, but mining access tunnel is comparable to size of room.
- Carolyn Shafer: Important for us to visualize that. As I understand it, 60% of waste rock would be mixed with concrete and fill whole room, concerned it would dry the mountain, plug it completely.
- Ty Ferre: State your concern for our modeling: we'd like South32 to provide research into how/if this has been used and results in long term monitoring (including whether backfill migrates).
- Linda Shore: To the point of ongoing modeling, understand mine life is 40-50 years, but the models we have run 5-10-15 years. Who is responsible for running models 5 years from now or 10 years from now so we have updates?
- Ty Ferre: If I were in your position you could say, we would like to know what future updates to the models will be and their projections. I would ask them to run model well past closure. Ask when models would be recalibrated. This is something to address in the Good Neighbor Agreement to get a good view of how this will be run in future.
- Melanie Lawson: We've worked in Nevada where paste backfill is common; not sure if they've closed any mines but can research where this has been done and see what did or didn't happen.
- Marcelino Varona: Ben Lomeli mentioned that in models, we should ask this question.
- Angie Donelson: It's in the minutes. All the questions the panel documented are part of the minutes; as panelists, you wrote them down during Ben's presentation last time.
- Ty Ferre: The key questions guiding our work for understanding models are: What is the model built to do? What are the key assumptions in the model? And third: if my question is X, how will your model construction limit the ability to answer my question?
- Ben Lomeli: Model should also be well calibrated, should undergo sensitivity analysis and should assess all dynamic parts in the whole system.
- Ty Ferre: Calibration means model can reproduce outcomes that have occurred in the past, but modelers may agree/disagree on projections. Sensitivity analysis is done on calibration (changing parameters affects calibration). However, this does not mean the model will well perform in the future.
- Ben Lomeli: That's why you monitor model to see how it performs and adjust.
- Ty Ferre: Exactly. In monitoring, some parameters are important for matching some observations. The panel should be thinking about outcomes that matter – how do we ask good questions of our model that help us make better decisions?

- Also wanted to touch on specific vs general models. Ideally, we build a model that models everything. Reality is that the bigger the model, the less information it has about specifics. The local model for mine operations needs to be nested within a more general model. That is, in those areas where we have a lot of information, we build a detailed model. The specific, detailed model that is built for the mine operation. However, it also has to continually inform the larger, less detailed model we use for understanding broader community impacts of dewatering.
- Linda Shore: Who is building the model?
- Tomas Goode: Newfields is our subcontractor working on the model. There's a number of consultants doing a number of different hydrologic related activities, but Newfields is doing the modeling.
- Melanie Lawson: The model isn't necessarily as important as the questions going into the model that the panel want to know.
- Ty Shore: There are different modeling platforms we can use. All have strengths and weaknesses but based on same underlying mathematical concepts.
- Tomas Goode: There are hosts of options and we can choose based on need (often modelers choose the modeling because of personal preference).
- Ben Lomeli: Most models will tell you what it was designed for and professional judgement also comes in. You could run say, three, with the same data to see which works best.
- Carolyn Shafer: Want to point out that these models are predictive: what is the action when a prediction is wrong and if the necessary immediate action is to shut down mining activity?
- Ben Lomeli: That's why we talk about a contingency plan. If you want to address and mitigate something, you need to detect it as soon as possible.
- Ty Ferre: The most important step is for you to identify concerns you have so that the hydrologic model can help you make smart decisions—platform you use is not as important as the questions you ask and decisions you make about what to include
- Marcelino: I Ty was going to build the model, that has now been cleared up
- Ty: My role is to assist in "peer reviewing" with your specific questions in mind
- Ruth Ann: Is there a limit on the number of models we use? If we want to change and redo the model, will South32 give the go ahead to create more models?

- Ty Ferre: Every model will be a compromise. If South32 is making a model just for dewatering, they would only consider that. We are looking to have you include questions we care about to query the model about the impacts. We look at each parameter and address level of uncertainty of the projections we care about.
- Ruth Ann LeFebvre: What is the timeline to get all these questions in?
- Ty Ferre: We will have process for everyone to write down every question they think will have an effect. I will work with Angie to develop framework for that at next meeting. Once questions are gathered, Ty can prepare something to be ready to talk to the modelers.
- Fritz Sawyer: Questions I had were going to be based on Tomas' presentation today. Are we going to see mounding in Patagonia? I don't know, I can't offer my questions until I see what the model has predicted.
- Ty: Panelists should do best to raise questions about their concerns. Fritz raises a question about a mass balance problem -- water has to go somewhere. What are the problems with mounding, how will these problems be exacerbated by the mine, and how can we address these?
- Carolyn Shafer: In the case of flooding, the mine will need to bring workers out of tunnel and shut down mining operations.
- Ruth Ann LeFebvre: Last meeting, president said they wouldn't do that.
- Ty: Try not to frame your questions: what could happen. Other solutions?
- Linda Shore: Build a dam and send water somewhere else.
- Ty: Yes, and think about other options – such as for storing or recharge. Think of contingency plans when they are possible.
- Marcelino Varona: Can contingency plans be placed in Good Neighbor Agreements?
- Ty Ferre: That is our contention, it is in some ways the best place to put them. Find structure that allows you to say, there are possible outcomes, we'd like to agree beforehand what would happen in these contingencies.
- Carolyn Shafer: Plus monitoring
- Ty Ferre: Yes, monitoring has to be part of it.
- Ben Lomeli: When panel provides Ty their questions, shouldn't it be answered by a team instead of a single person deciding how to interpret those questions?

- Ty Ferre: Happy to accept input in this process.
- Ty Ferre: Also as part of this process: will have conversations with South32's modeling group and questions about model for panel.
- Angie Donelson: What are the dates we have Newfields coming to the panel with feedback and recommendations?
- Tomas Goode: Depending on time frame, I can present and address those questions. Intent is to have Ty review modeling. If he's comfortable with process that's been gone through, he as the objective third party he can bring up concerns and changes to be made.
- Angie Donelson: Helpful for panel to have timeline in writing from South32 and Ty's side (dewatering roadmap for the panel). Will work with South32 and Ty to have this to the panel at the next meeting.

1:05 Review Agenda: two items – workforce discussion and dewatering roadmap

- Angie Donelson: We will define next time a process for you to address your questions. This is framed in the larger context of the panel's work and all the information we have been receiving for panel action (see Appendix A). We want all questions to be answered as defined in the Hermosa panel charter. We also would like to document who answers them, as well as how follow up questions are addressed.
- Lizbeth Perez is assisting by documenting all in a spreadsheet. We this this into a relational database that could be foundational to informing a Good Neighbor Agreement.

1:10 Acceptance/Amendments to Meeting Minutes (March)

Note: Revised minutes had correction– Linda Shore lives in Red Rock, not Carolyn

- Ruth Ann LeFebvre: Question to Melanie about the minutes. You said traffic study started in April. It's April. Has it started? How when/how panel can be involved with that traffic element?
- Melanie Lawson: A few months ago, we discussed how the panel fits in that and can provide an updated set of slides on the panel's role. We will start updating the traffic study to get permits we need from ADOT. We can identify how the panel can address those issues relating to land dedication and traffic mitigation.
- Ruth Ann LeFebvre: Will you share information once the study is done? And that isn't until 2023?
- Carolyn Shafer: Is it possible for you to share traffic numbers that are going to ADOT? Want to see traffic impact study that South32 is going to send ADOT as soon as available.

- Melanie Lawson: I can ask, there is a process and we can't get ahead of ADOT. We can discuss and share at the next meeting. We want to be sure you can review it.
- Angie Donelson: We will define the panel's role – the spectrum of panel engagement can be from receiving information to empowerment for decision-making. We will provide more information for the next meeting.

1:16 Panelists: Report Updates

The Nature-Based Restorative Economy in Santa Cruz County, Arizona, Linda Shore

- A year and a half ago, a number of groups locally came together to raise money to hire a consultant for this work. The group hired University of Arizona to do the work; we understand the study is the first of its kind to quantify the economic impacts of a local nature based economy. It was published December 2021 and we presented this information to the County Board of Supervisors.
- 4- page document shows 779 jobs, 35 million dollars, 76 million in sales brought in by nature-based economy in 2019.
- Olivia Ainza-Kramer: The Chamber of Commerce has seen more tourists wanting to see what Santa Cruz County has to offer.
- Carolyn Shafer: We have seen visitors primarily from other places, showing Patagonia's role as a worldwide destination for nature-based activities.
- Fritz Sawyer: concern that impacts from nature-based economy and tourism are not fully addressed (see comments he delivered to the panel: Appendix B). Some adverse effects have been overlooked.
- Carolyn Shafer: Every economic study has this issue, including South32's recently released economic impact study.

Patagonia Area Resource Alliance - Carolyn Shafer

- Refer to Appendix C. The informational update contains an update on the APP appeals process, a presentation Ben Lomelli made to the Patagonia Flood and Flow Committee (similar to the presentation he made to the panel last month), and information about a May 7th, symposium to learn more about watershed.

The Nature Conservancy - Damian Rawoot

- Nature Conservancy staff, Bureau of Reclamation, and University of Arizona did a native fish survey last week at Patagonia Lake. The fish look good – there are no invasive species.

1:27 Workforce Development Alignment: Dr. Robin Breault, Lead Local

- Panelists participated in a small group work to map workforce outcomes 2.0, based on feedback they have provided to date on desired workforce outcomes 1.0 (see Appendix D). Robin will provide an updated draft at the next meeting for further work.

2:00 Wrap Up and Looking Ahead: May 18 meeting

- Angie and Robin distributed a survey; responses are below:

Today we began to chart directions for workforce collaboration and learned about options for a dewatering roadmap...How are you feeling so far and how can we improve?

- This was a great meeting. More time on developing the dewatering model
- Feel like we're back on track. Glad we are moving forward. Thank you!
- Good. Staying focused.
- This is a very positive experience for the community. I feel if we had a visual of the questions during the meeting, it would prevent repetitive comments.
- Fantastic...learning more every meeting. Continue with providing background information that I may not have received due to being newer to the panel.
- A lot has been accomplished. Amazed so much is discussed. Maybe have longer meetings.
- Good. We are making steady progress on complex issues. As possible, it's great to add specifics on what South32 has planned (moving away from theoretical discussion)

What do we need to address next?

- Sets of questions to develop a meaningful model
- More time for developing skills to meet South32 needs
- Water models and transportation
- Other businesses should be involved.
- Continued background information.
- Water, water, water.
- Tomas, Tomas, Tomas (Goode) – dewatering, modeling and permitting
- Good Neighbor Agreements – what research says, what questions need to be answered.
- We need to continue developing the infrastructure/framework for the community and South32 to collaborate

How well have you felt heard so far? (0-5, with 0 not at all and 5 very well)

- 4 (3)
- 5 (5)

- **Agenda for Next Meeting**

Panel will address workforce development recommendations with Dr. Robin Breault and discuss the process for documenting questions for the dewatering roadmap.

South 32 Panel Planned Work in 2022

INFORMATION

Community impacts

Commissioned by South32 in 2021-2:

- Social Impact & Opportunity Assessment
- Local Procurement Assessment and Strategy
- Water modeling/conceptualizing desired outcomes
- Workforce development strategy
- Economic Impact Analysis

Desired outcomes & measurement strategy

Tool for

Tool for

Potential searchable relational database of panelist questions/answers

ACTION

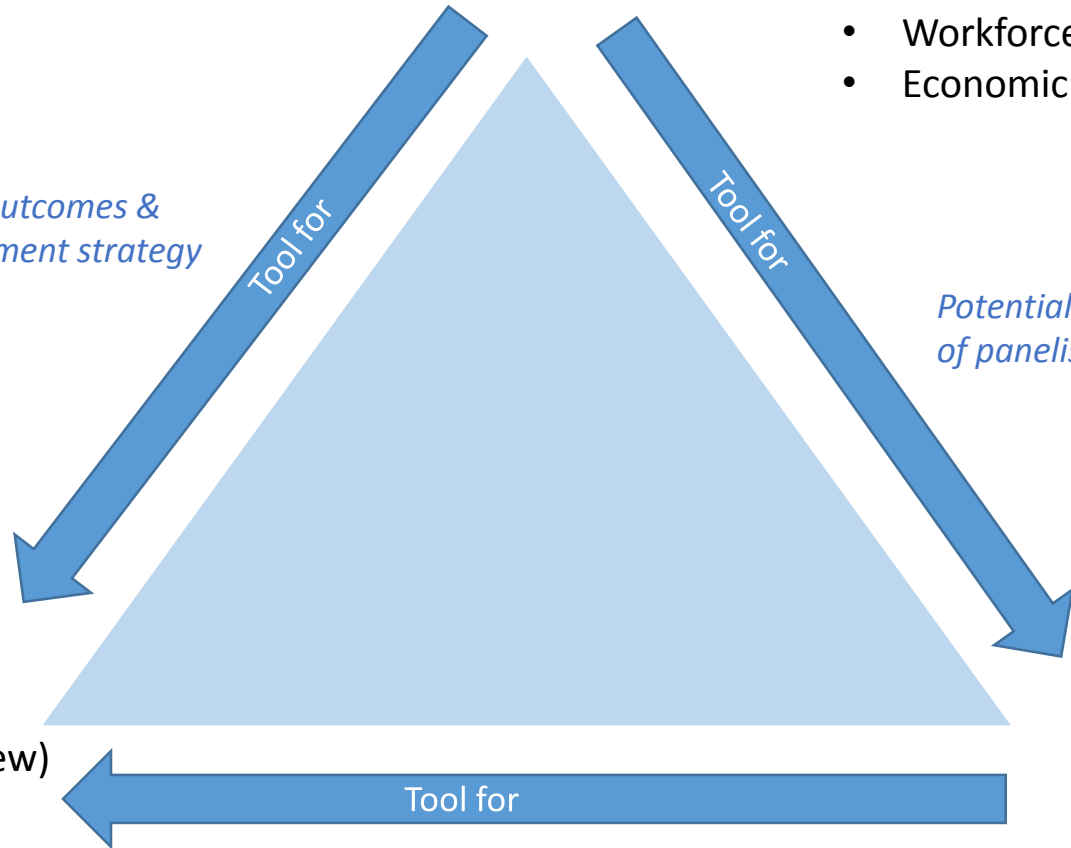
- Mitigation Strategy (quarterly review)
- Investments in LT infrastructure

Tool for

Good Neighbor Agreements

UNCERTAINTY

Data gaps (unknown impacts)



Searchable relational database of panelist questions/answers

- Could present all questions raised to date by panel and how/when answered
- Uncertainty/mitigation strategies could be foundational for Good Neighbor Agreements and public participation processes
- Consider for panel Technical Assistance budget - May or June 2022

Potential relational database categories: water

Phase of project question

Dewatering

General mitigation

Tailings

Other (define)

Tod Newman (data analytics) will also use FAQ and county documents to identify additional categories across workforce, water, transportation, wildlife management issues, etc.



Category of question

Effects of increased streamflow

Limits to water management during production

Monitoring during production

Monitoring before production

GW/SW coupled modeling

Climate scenarios and climate variations

Pumping impacts on streamflow

Modeling: boundaries, properties, structures

Bases of beneficial use

Treatment of fractured system

Effects of dewatering in space and time

Riparian vegetation impacts

Contaminant transport – model/monitor

Timing of recovery after closure

Depth modeled in South32 model

Water treatment

Acid rock drainage

Other (define)

We would like your feedback please!!

Appendix B

Fritz Sawyer – Statement for 4.2.21 minutes

The *Nature-Based Restorative Economy in Santa Cruz County* report (Duval et.al.) (report) provides a well-considered analysis of how nature-based tourism, nature-based industries, and conservation, restoration, and preservation adds to the economy of Santa Cruz County. Looking at the numbers presented in Part III of this report, the total estimated visitor days into Santa Cruz County are on the order of 1.3 million. Domestic trips by U.S. residents are projected to increase at a 9.4% annualized rate from 2021 to 2026 (Duval et. Al 2021). Globally the ecotourism industry is projected to grow at a rate of 14.3% per year over the decade (Duval et.al. 2021).

It would be misleading to assume that the past and future levels of visitation do not impact the environmental resources of Santa Cruz County at varying levels (i.e., air quality, greenhouse gas emissions, haze, loss of dark sky, illegal surface disturbance exacerbating erosion and stormwater flows, introduction and spread of noxious species, impacts to wildlife due to human presence, and changes to water quality). There are already ongoing impacts to infrastructure (i.e., traffic, roads, demands on potable water, and waste management (solid and sanitary); these impacts would be expected to increase with increased visitor days.

The report does not address the adverse impacts to environmental resources and infrastructure associated with the ongoing and projected increases to the Santa Cruz County nature-based restorative economy. This information needs to be developed to provide a balanced analysis to better address potential impacts.

Category	2019 Visitor Days	2019 Total Visitor Days
Tumacacori N.P.	39,704	39,704
State parks	237,504 (Patagonia) 8,031 (Tubac)	285,239
Coronado N.F.	494,333	494,333
Other Lands	24,261 (Paton) 1,355 (Borderlands) 10,000 (TNC) 95,900 (Sonoita Creek) 199,000 (Santa Cruz River)	330,516
Agritourism (wineries)	124,500	124,500
Hunting	25,712	25,712
Total	-	1,300,004

Source: *Nature-Based Restorative Economy in Santa Cruz County* (Duval et.al. 2021), Part III

P. 102 or 160 – employment expected to increase by 8.2% by 2029, an increase of 1,232 jobs. This increase is distributed across industries, with some projected to gain in employment, and others projected to contract. Health care and social assistance is expected to see the largest percent gain. The largest gain in terms of numbers is anticipated in the transportation and warehousing industry which is connected with the region's fresh produce industry.

P. 110 of 160: Nature-based tourism: 10 years: low to moderate growth / 30 years: moderate to high growth

**INFORMATION for the Santa Cruz County Advisory Panel on Hermosa Project
Presented by Panelist Carolyn Shafer as a PARA Board Member
April 20, 2022**

These are three sources for information relative to water issues in the Sonoita Creek Watershed that I recommend:

- The [Town of Patagonia “Sonoita Creek Flood & Flow Committee”](#) (“F&F”) which conducts (currently via Zoom) monthly public meetings the second Thursday of each month at 10 a.m.
- [Friends of Sonoita Creek](#) (“FOSC”)
- [Patagonia Area Resource Alliance](#) (“PARA”)

**UPDATE: PARAs Appeal of Aquifer Protection Permit (APP)
Issued by AZ Dept of Environmental Quality to South32**

Written closing arguments were filed by all parties on March 21. Judge Shedden is reviewing the transcripts of the nine-day hearing and the closing arguments. He requested up to two months to review the materials so his recommendation to the Water Quality Appeals Board is expected no later than May 21.

March Presentation on Local Hydrology by Ben Lomeli

Ben presented a similar program at the April 14 Town of Patagonia Flood & Flow Committee meeting. I will share a link for the recording with Angie to forward to the Panel members. It may be another week or so before that recording is available.

**AN OPPORTUNITY TO LEARN MORE ABOUT THE WATERSHED
Sponsored by Friends of Sonoita Creek and Cienega Watershed Partnership
(schedule and contact information on reverse side)**

Discovering the Land
Community, Science, and Partnership
in the Sonoita and Patagonia Region.
Saturday May 7th
10 AM - 5 PM

Please RSVP - <https://www.eventbrite.com/e/294918247417>

to attend and get more details about speakers, guests, and the event! Please contact us to table or share your experience in these watersheds.

The Cienega Watershed Partnership and Friends of Sonoita Creek are co-hosting the Science on the Sonoita Plain Symposium, but with a new twist from the previous eleven symposia. This year, we are taking it outdoors and want to provide a wide network of regional partners the opportunity to highlight and learn about community science initiatives in two watersheds. The event will cover science and engagement across the Cienega and Sonoita Creek Watersheds from Vail to Patagonia and beyond. You are invited to share your experience with local and regional partners, stakeholders, and community members in a day of exploration and presentation:

The day is divided into three parts:

10:00am–11:30am -- At the Empire Ranch Headquarters

Listen and discuss with experts about water, wildlife, and ranchland preservation across the watershed

11:30am–1:00pm -- Lunch

Open exploration of a local Sonoita, Patagonia, or Elgin restaurants, vineyards or picnic areas

1:00pm–3:00pm -- At The Nature Conservancy's Sonoita Creek Preserve

Q&A with restoration, trails, and citizen participation leaders across the region

3:00pm–5:00 pm -- The Nature Conservancy's Sonoita Creek Preserve

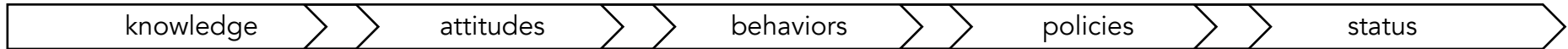
Afterwards, we invite everyone to continue to stay at this beautiful site to relax and enjoy festivities at the end of the day

Contact outreach@cienea.org to get on the Cienega Watershed Partnership newsletter list, or sonoitacreek@gmail.com to sign up for the Friends of Sonoita Creek newsletter lis.

STRATEGY 1: Increase Opportunities through Industry Engagement

Cultivate cross-sector business and industry engagement and relationships that support :

1. WIB board participation and support
2. Small business and entrepreneurial ecosystem development
3. Cross-sector skill development and collaborative training opportunities
4. PK-20 educational engagement to increase career awareness, WBL, and access to professional networks
5. Leverage regional business and industry expertise to attract and retain talent and new businesses

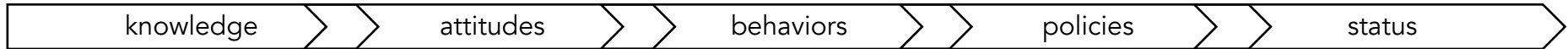


SHORT (understanding) Outcomes that reflect learning and knowledge.	MID (doing) Outcomes that reflect changes in behaviors or action.	LONG (being) Outcomes that reflect state changes.
What are the top 2-3 things we should do?	What are the top 2-3 things we should do?	What are the top 2-3 things we should do?
Who (orgs or indiv.) should be involved? And who has motivating interests?	Who (orgs or indiv.) should be involved? And who has motivating interests?	Who (orgs or indiv.) should be involved? And who has motivating interests?

STRATEGY 2: Create More Opportunities for Workforce Training and Skill Development

Support local workforce and talent development through S32 collaboration with the WIOA to establish training timeline and providers for local cross-cutting industry needs (workforce readiness, skilled trades, etc.), communicate skills transferability to stakeholders Identify, and recruit participants for training programs.

Explore innovative partnership and program opportunities that support regional business and industry competitiveness; such as: updating logistics program offerings; partnering on cross-border training initiatives; leveraging local and regional expertise for training.

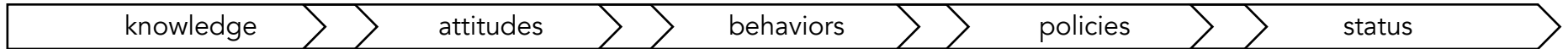


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STRATEGY 3: Develop a Regional Approach to Career and College Readiness

Align regional certifications and local industry-relevant pathways, incorporating options for DE/early college and interdisciplinary “on ramps” to CTE pathways that address student interests and traditional coursework.

Develop a broad range of work-based learning experiences incorporating innovative approaches that align with funding opps (e.g. state course #); incentivizing engagement for students, educators and businesses; and leveraging peer and intergenerational mentorship.



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