

The background of the slide is a photograph of a fishing vessel's deck. Several workers wearing bright orange rain gear and hoods are visible, working with large quantities of fish. The deck is cluttered with fishing equipment and the fish themselves. The sea is visible in the background, appearing somewhat grey and overcast.

# How Can We Manage Fisheries More Safely?

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by

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A wide variety of evidence suggests that fisheries management contributes to fishing safety problems.

How can we manage fisheries more safely?

## *Fisheries management:*

Government laws and regulations affecting fishing.

- Who
- How
- Where
- When
- How much

## *Fishing safety:*

How safe commercial fishing is,  
as measured by rates of fatalities, injuries,  
and vessel damage and losses.

Studies from many countries suggest that management contributes to safety problems:

### CANADA

*“ . . . Factors that contribute to safety issues in the small vessel fishing fleet . . . include . . . fish management regimes that do not give adequate consideration to safety issues.”*

(Woodley and Burge 2000)

### DENMARK

*“ . . . The entire way in which the fishing industry is organized must be regarded as a contributory factor to the current situation [of fishing safety problems].*

(Jensen, 1997, 141)

### FAO STUDY

*“ . . . Even though fisheries management systems are not meant to regulate safety at sea, they inevitably have an effect in this respect.”*

(Petursdottir, Hannibalsson, & Turner 2001)

## Fisheries management may affect fishing safety through many direct and indirect mechanisms.

<i>EXAMPLES OF MANAGEMENT-RELATED FACTORS</i>	Examples of conditions contributing to risk					
	Cramped working conditions	Fishing on vessels too small for conditions	Fishing in unsafe weather	Fatigue from continuous fishing	Poorly maintained equipment	Lack of safety gear
<i>Vessel size restrictions</i>	X	X				
<i>Fishery openings in bad weather</i>			X			
<i>Short seasons and "race for fish"</i>			X	X		
<i>Low incomes because of over-fishing &amp; over-capitalization</i>		X	X	X	X	X

Until the 1950s, management regulations banned the use of engines in Alaska's Bristol Bay salmon fishery—an area of dangerous tides and very cold waters.



*Bristol Bay salmon fishing boats, ca. 1935*

How can we manage fisheries more safely?

The simple answer:

Stop management practices that contribute to risk.

Stop:

Vessel size restrictions  
Fishery openings in bad weather  
Short seasons  
The "race for fish"  
Over-fishing  
Over-capitalization  
Etc.



But no one wants fisheries to be dangerous.

If stopping management practices that contribute to risk were easy, we would have already done it.

We need to ask:

Why do fishery managers manage fisheries in ways that contribute to safety problems?

What can we do about it?

I will suggest six reasons and six answers.

Why do fishery managers manage fisheries  
in ways that contribute to safety problems?

## REASON #1

Responsibility for “management” is divided  
from responsibility for “safety.”

## Do managers think about safety?

- In some countries safety is included as a formal management goal.
  - U.S. fishery management “National Standard 10”
- In many countries safety is completely outside the formal responsibility of managers

## NEWFOUNDLAND (CANADA)

*“The objectives and principles established to achieve fisheries management goals have always been clearly defined. Just as distinctly has been the absence of objectives relating to fishing vessel safety, either primary or secondary.”*

(Wiseman & Burge, 2000)

Responsibility for “management” is divided  
from responsibility for “safety.”

What can we do about it?

Incorporate safety as a formal goal and  
responsibility of fishery managers.

Why do fishery managers manage fisheries in ways that contribute to safety problems?

## REASON #2

Fisheries management is difficult.

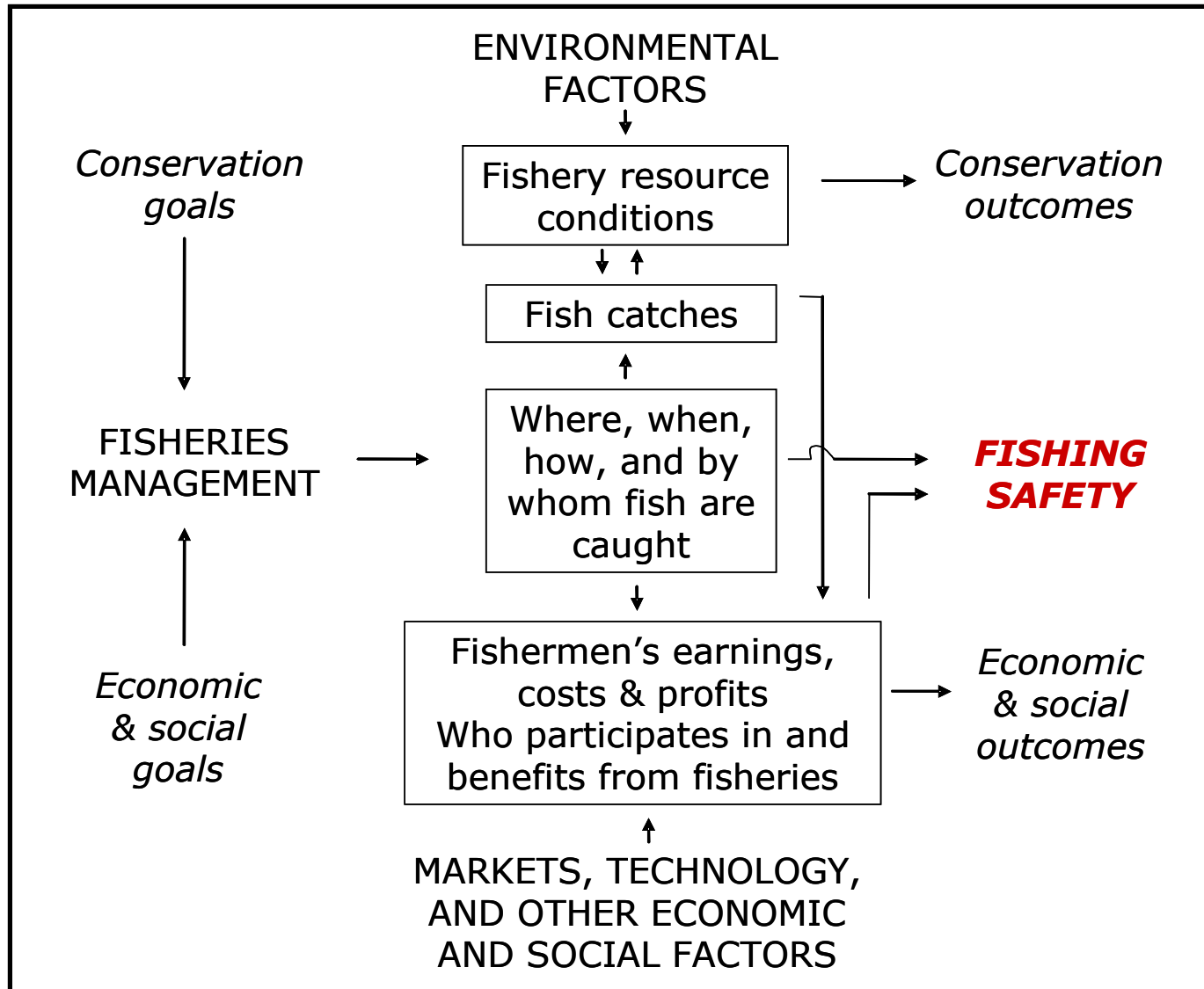
Considering safety makes it more difficult.

## Fisheries management is difficult.

- Fisheries are complex ecological, economic & social systems
- Limited information
- Multiple and often conflicting goals
  - Conservation
  - Economic goals
  - Social goals
- Highly controversial
- Limited enforcement capabilities
- Limited funding



Fisheries management is difficult.  
Considering safety makes it more difficult.



Fisheries management is difficult.  
Considering safety makes it more difficult.

What can we do about it?

Require managers to consider safety.

Provide managers with more funding to help them  
consider safety.

Why do fishery managers manage fisheries in ways that contribute to safety problems?

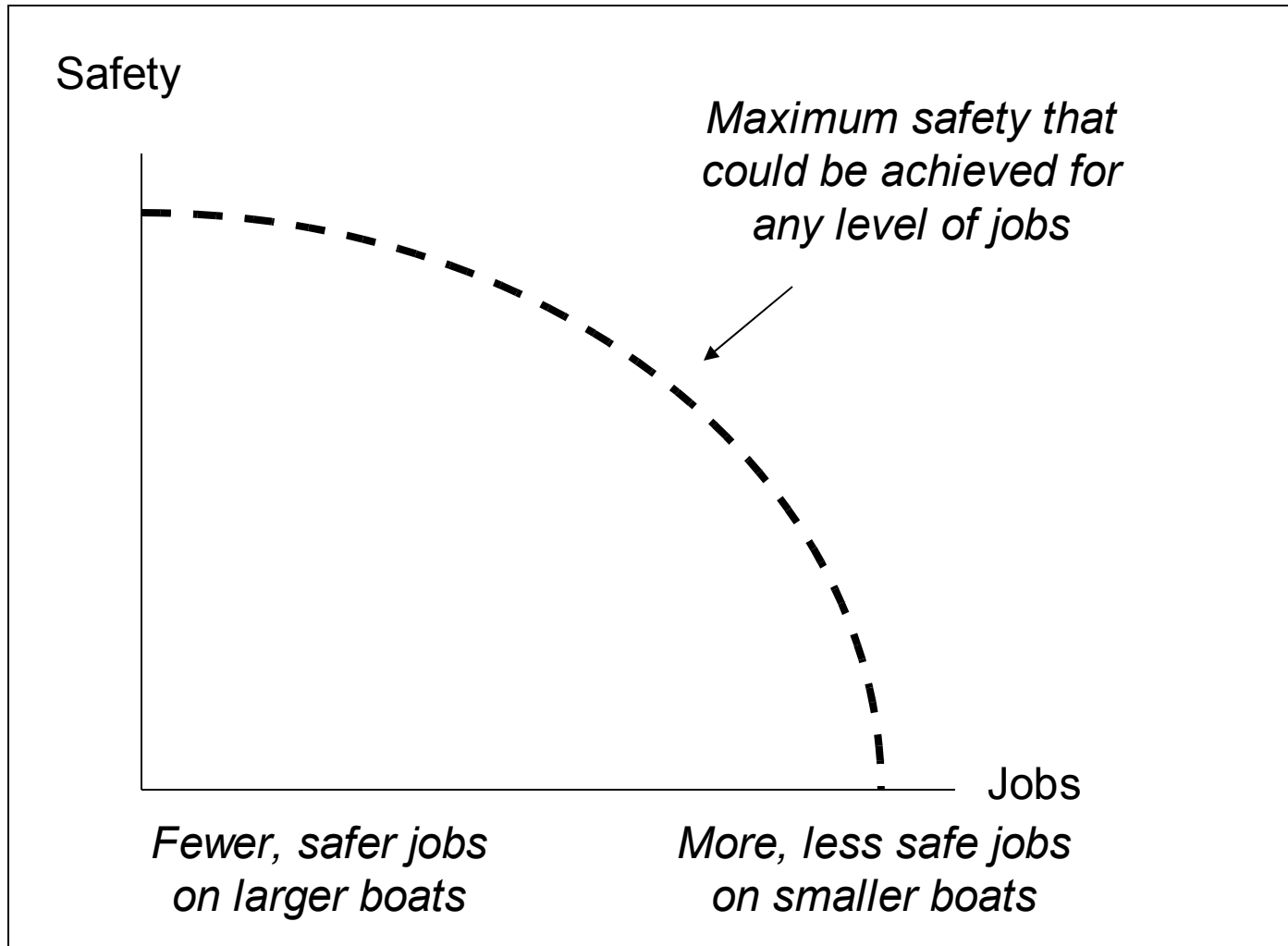
### REASON #3

Managers face tradeoffs between safety and other management goals.

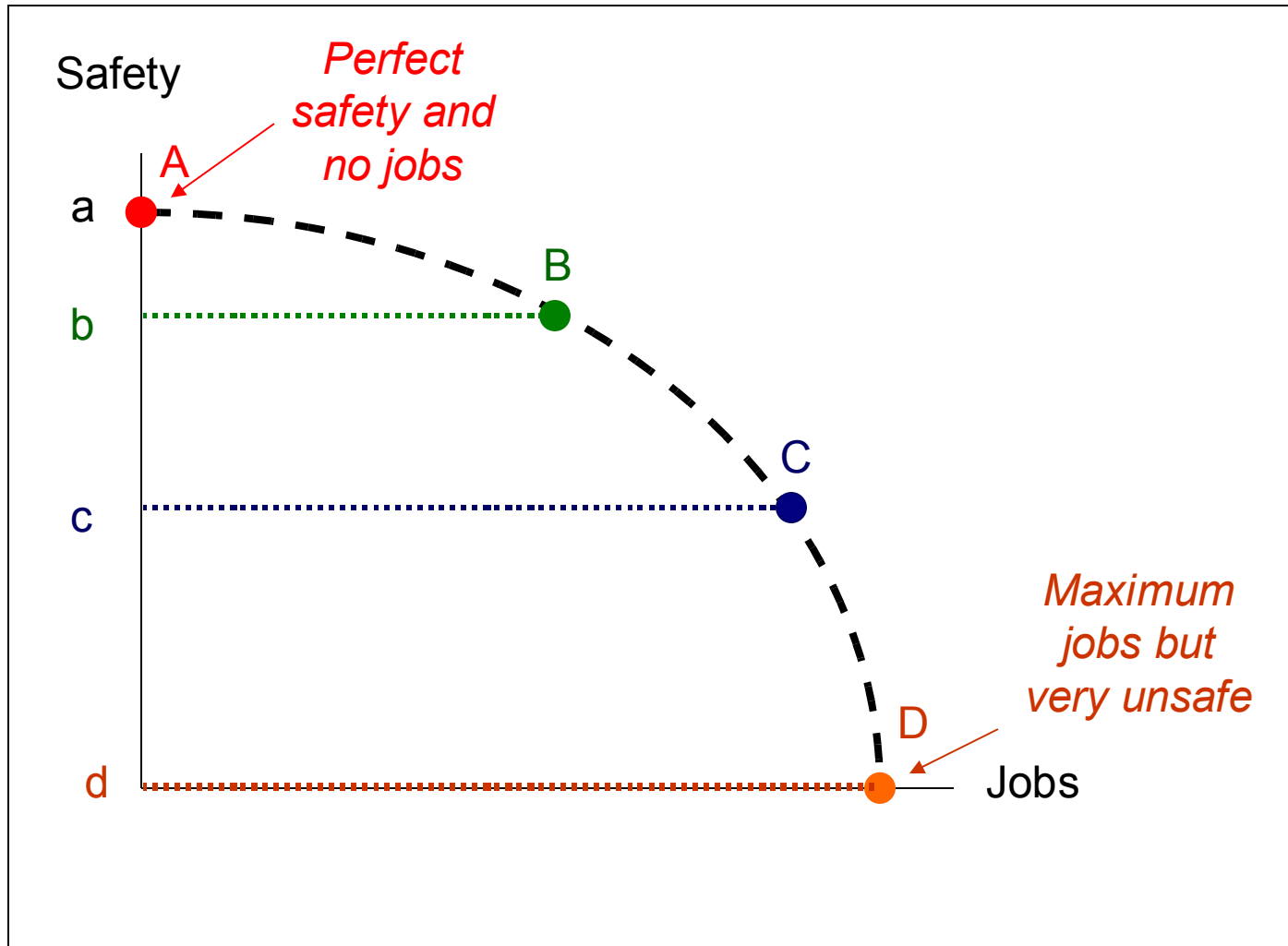
How much safety to choose is not obvious.

An example:

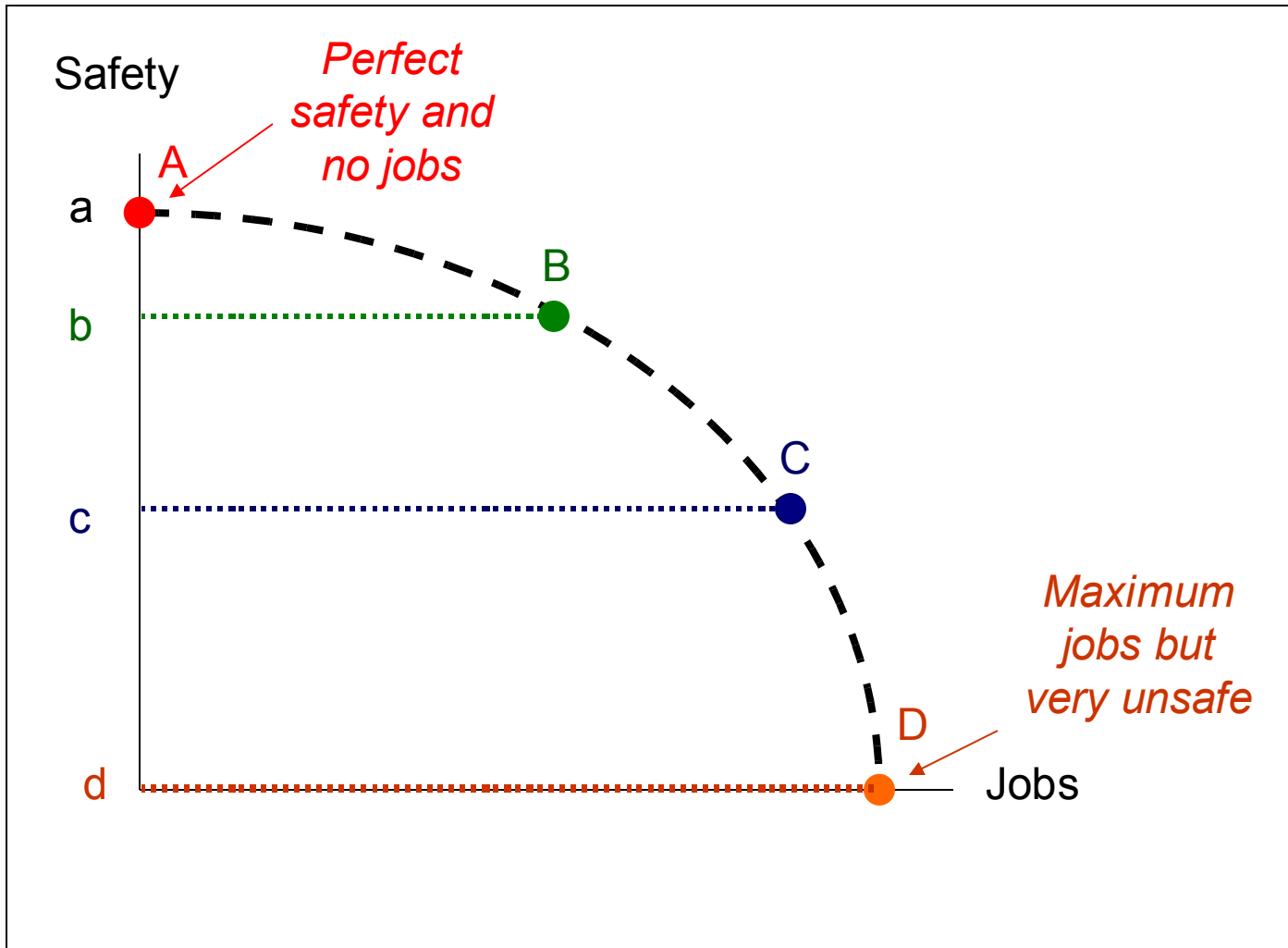
Managers may face a tradeoff between safety and fishing jobs.



# Which level of safety should managers choose?



The answer is not obvious.  
Probably they should NOT choose **A** or **D**.  
But should they choose **B** or **C**?



Managers face tradeoffs between safety and other management goals.

How much safety to choose is not obvious.

What can we do about it?

Apply political and moral pressure on managers to make safety a higher priority.

Why do fishery managers manage fisheries in ways that contribute to safety problems?

## REASON #4

Fishermen influence managers.

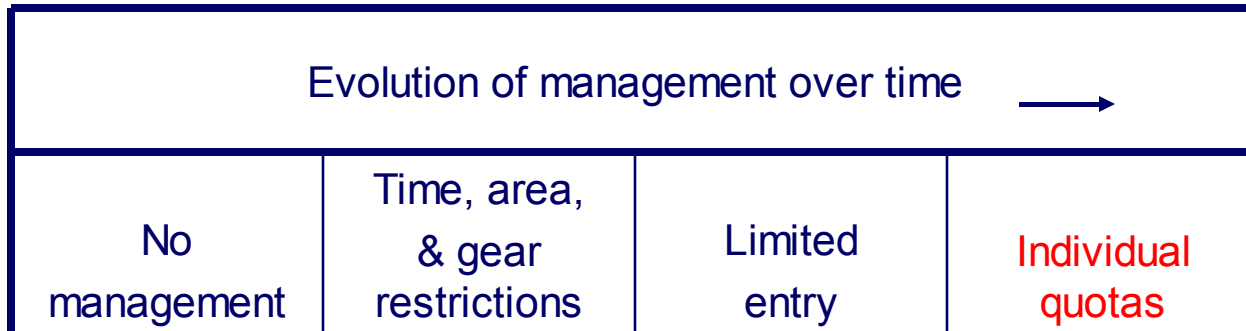
If safety conflicts with other goals of fishermen, fishermen may argue against safer management.



## Example

Fisheries management has tended to evolve over time through four “stages.”

The newest stage—gradually being implemented in many countries—is **individual quotas**.



Each stage is implemented in response to problems in the previous stage.

But each stage creates new problems and new controversies.

Individual quotas address many economic problems.

But they create new problems and controversies including loss of jobs and unfair quota allocations.

<i>Typical problems</i>	Evolution of management over time →			
	No management	Time, area, & gear restrictions	Limited entry	Individual quotas
<i>Over-harvesting</i>	X			
<i>Over-capitalization</i> <i>“Race for fish”</i>	X	X	X	
<i>Loss of jobs</i> <i>Unfair quota allocations</i>			X	X

*A “race for fish in Alaska’s  
Bristol Bay salmon fishery*

Certain management  
conditions contribute to a  
“race for fish.”

- Open access
- Overcapacity
- Short seasons
- High value resources
- Low volume resource

(Woodley, 2002)



*Photograph by Bart Eaton*

A “race for fish” may negatively affect safety by creating a financial incentive for:

- Operating in all weather and sea conditions
- Operating without rest
- Risk-taking behaviors

(Woodley, 2002)

Individual quota management has the potential to make fishing safer by ending the “race for fish.”

Evolution of management over time →			
No management	Time, area, & gear restrictions	Entry limits	Individual quotas
<i>Fishermen “race for fish”</i>			<i>No “race for fish”</i>

Individual quota fisheries are safer

*but*

Individual quota fisheries result in fewer jobs.  
Many fishermen think quota allocations are unfair.

So many fishermen oppose individual quotas.

Fishermen influence managers.

If safety conflicts with other goals of fishermen, fishermen may argue against safer management.

What can we do about it?

Devise ways of managing more safely that don't conflict with other goals of fishermen.

If we can find ways to make individual quotas benefit more fishermen, more fishermen will support individual quotas.

Individual quota management doesn't have to cost jobs.  
Individual quota allocations don't have to be unfair.



Why do fishery managers manage fisheries in ways that contribute to safety problems?

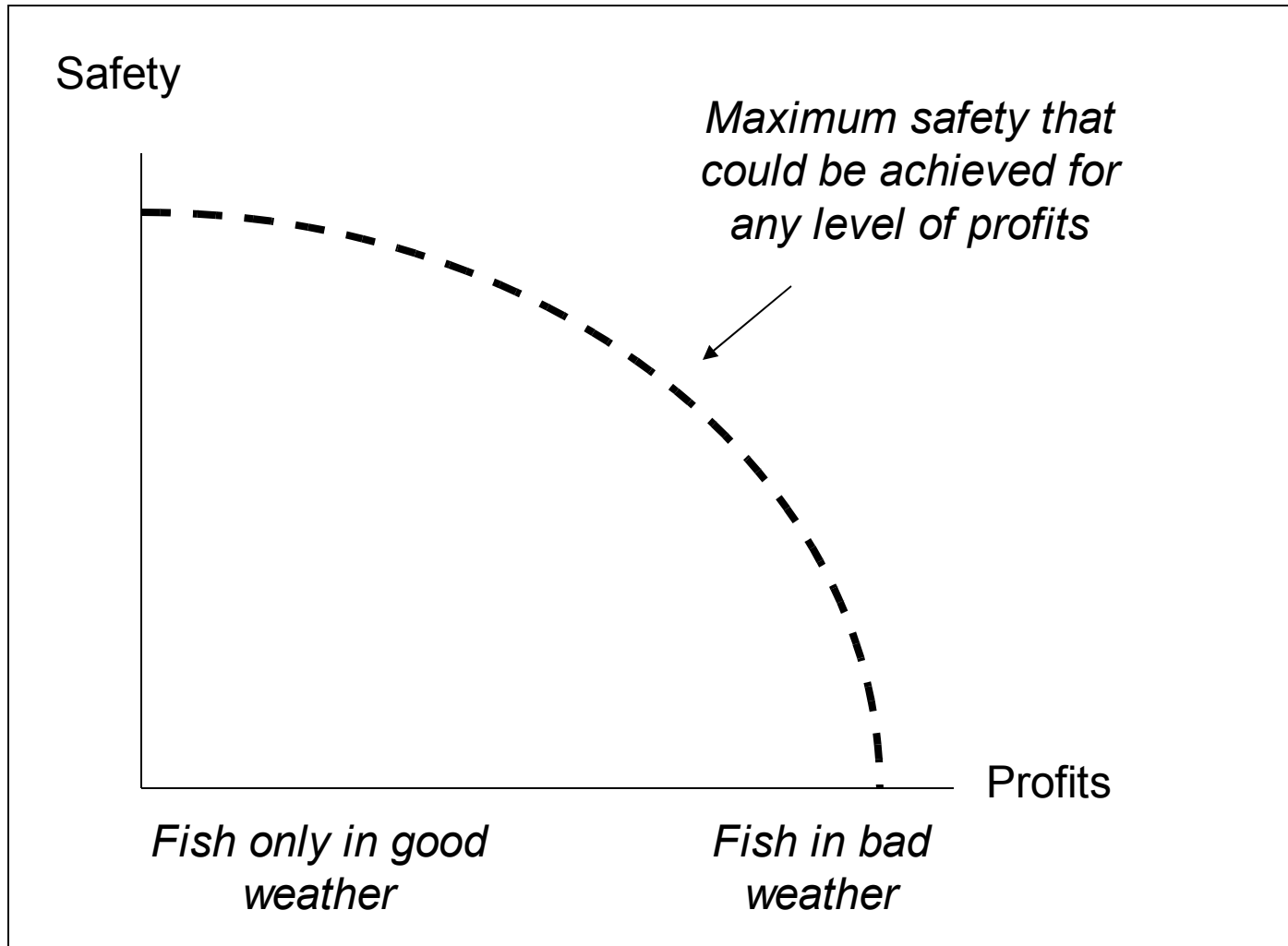
## REASON #5

Fishermen make choices between safety and other goals.

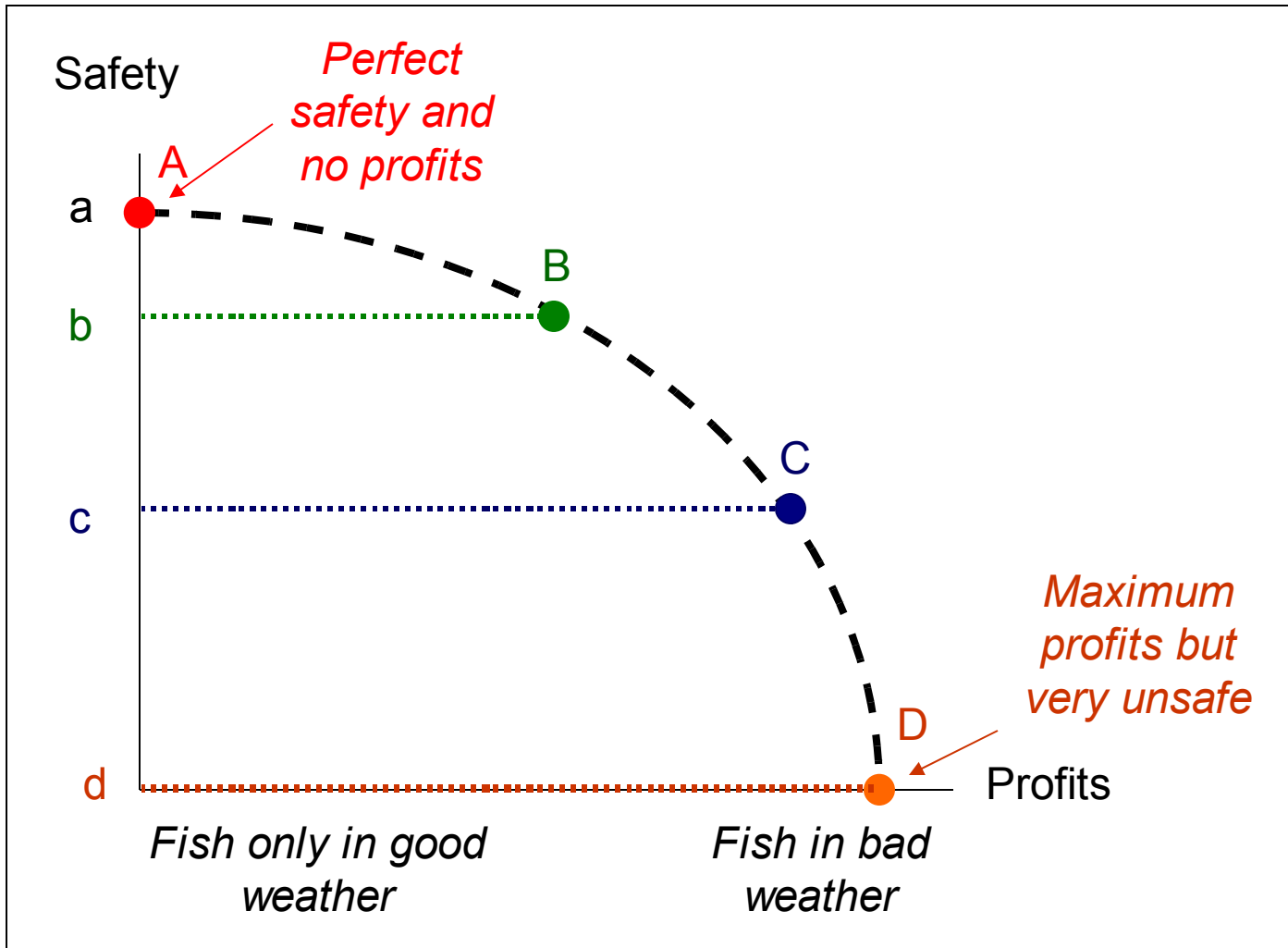
If managers make it possible for fishermen to be safer, fishermen won't necessary choose to be safer.

## Example:

Fishermen may face a choice between safety and profits.



Which level of safety will fishermen choose?

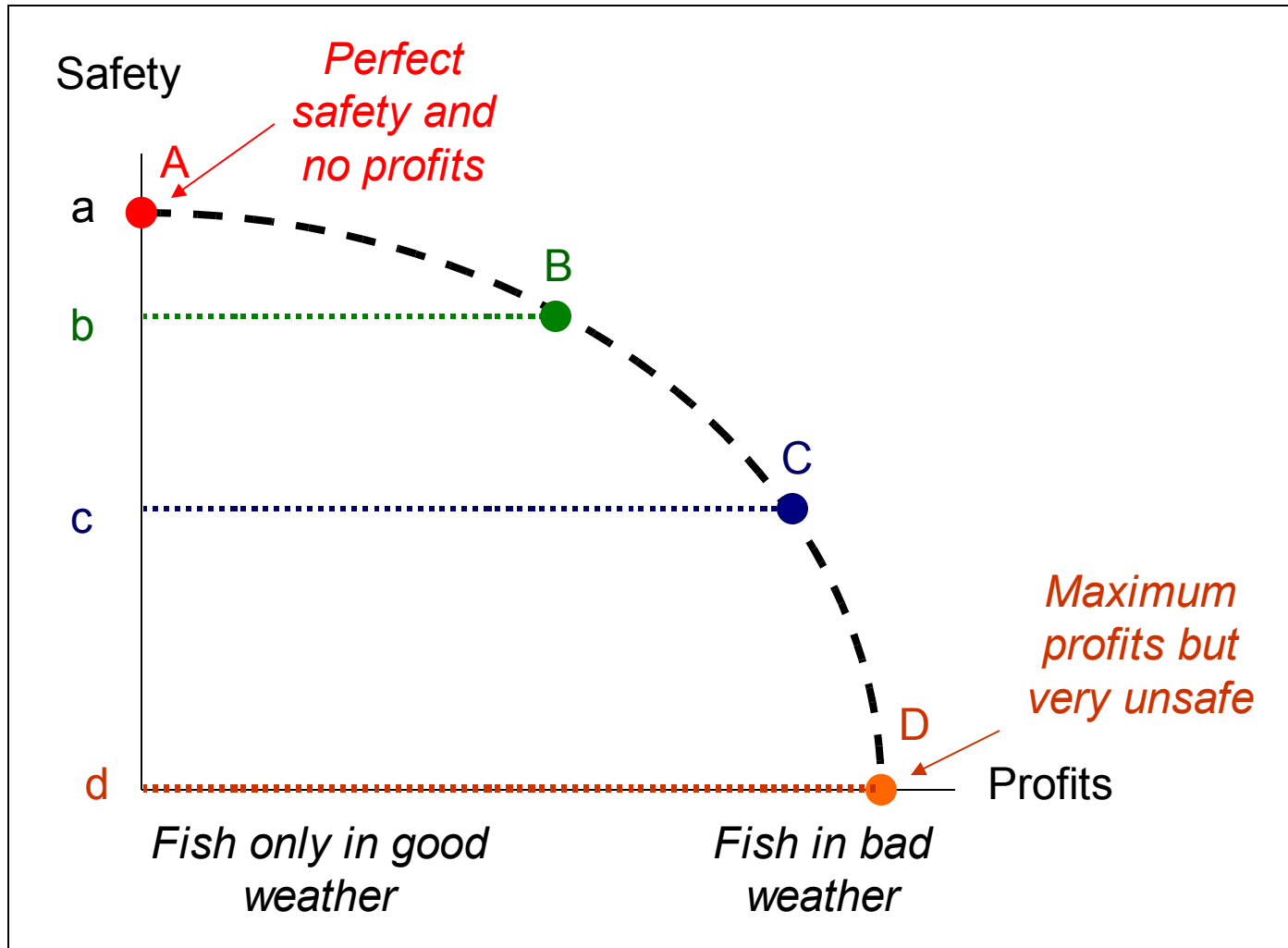


They don't choose A (or they wouldn't be fishermen).

Some choose B

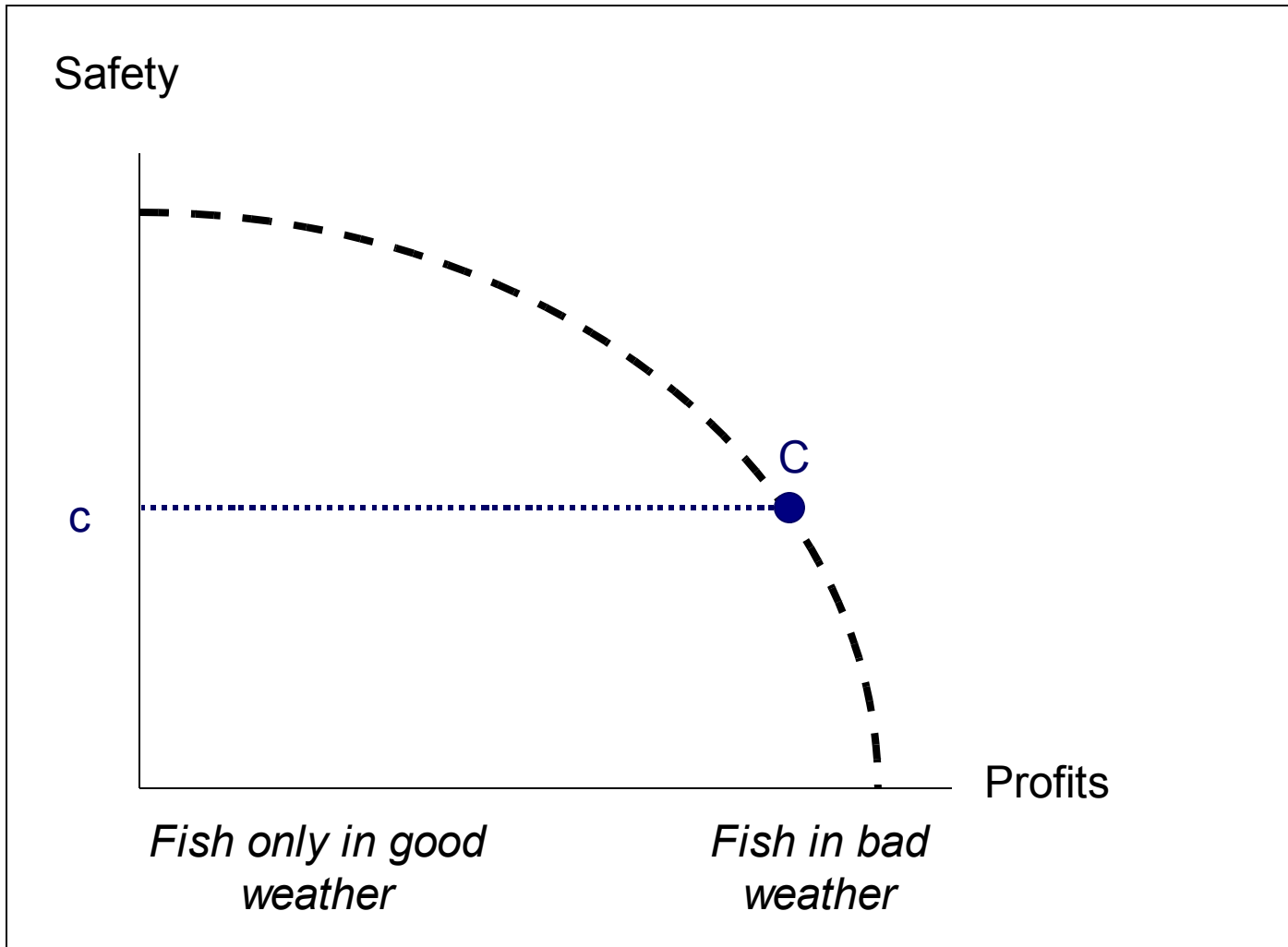
Some choose C

Some choose D

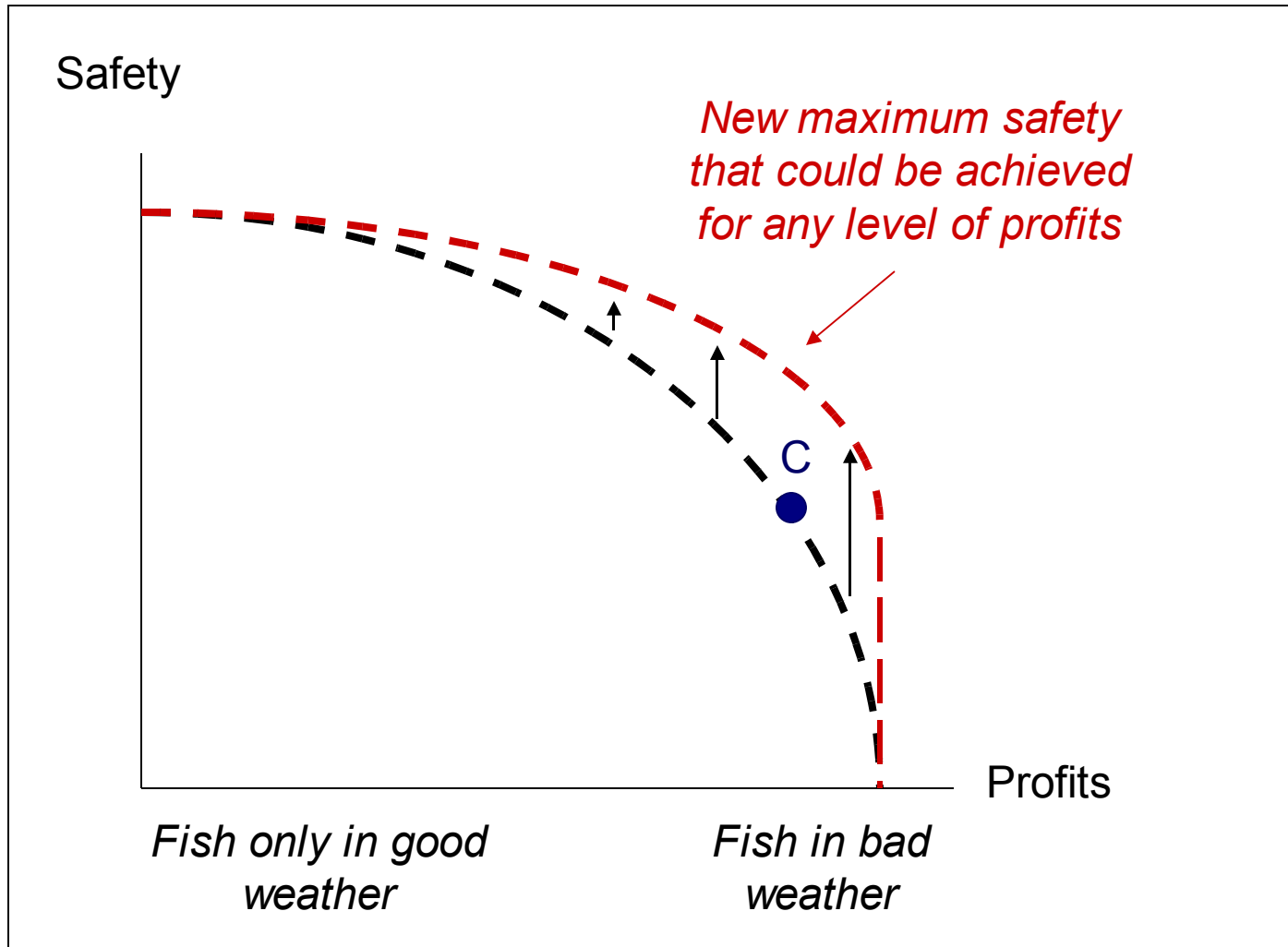


If managers make it possible  
for fishermen to be safer,  
fishermen won't necessary choose to be safer.

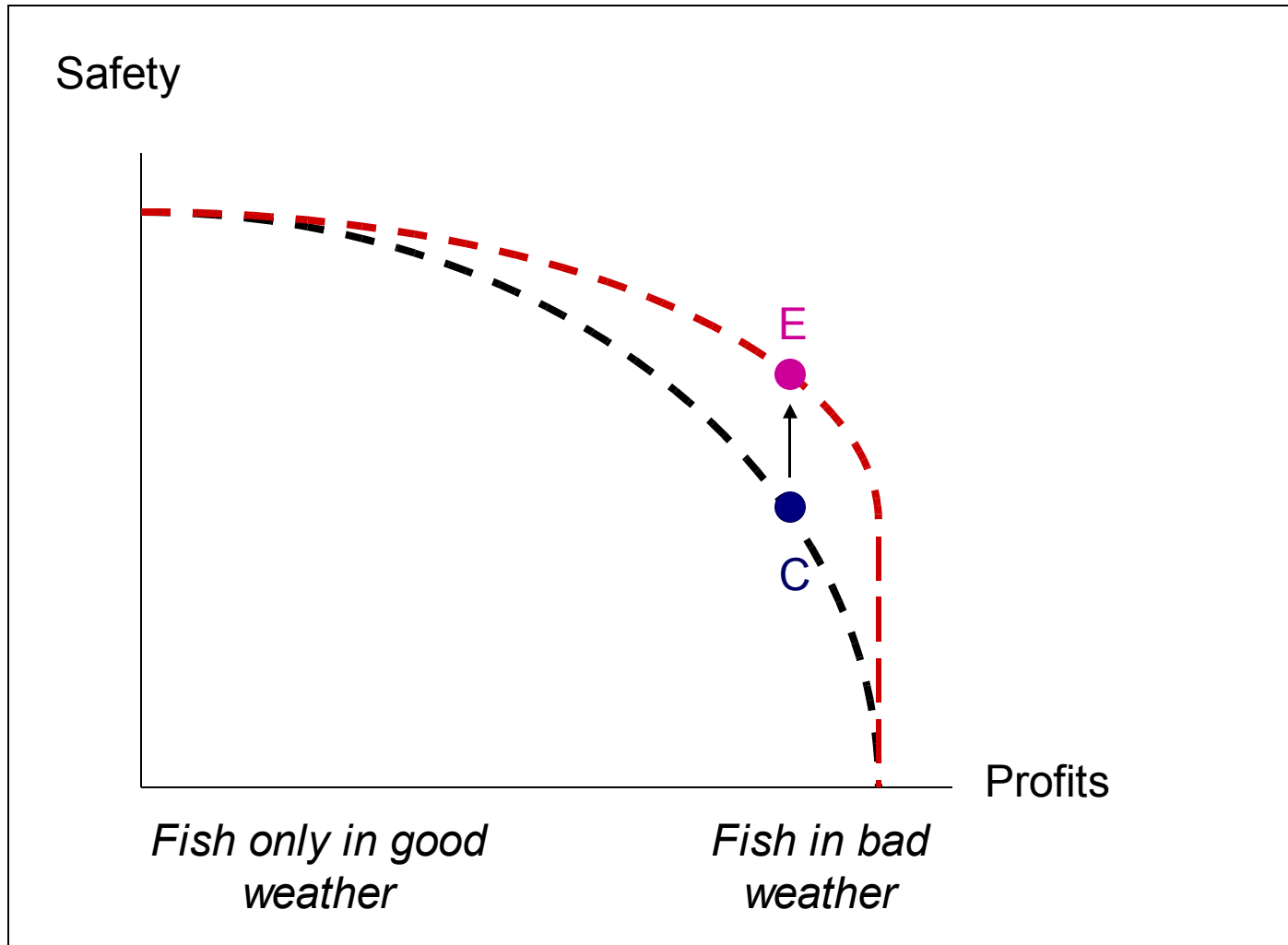
Suppose the fisherman has chosen level of safety C.



What will happen if managers make it possible for the fisherman to earn the same level of profits more safely?  
(for example, by allowing bigger boats)

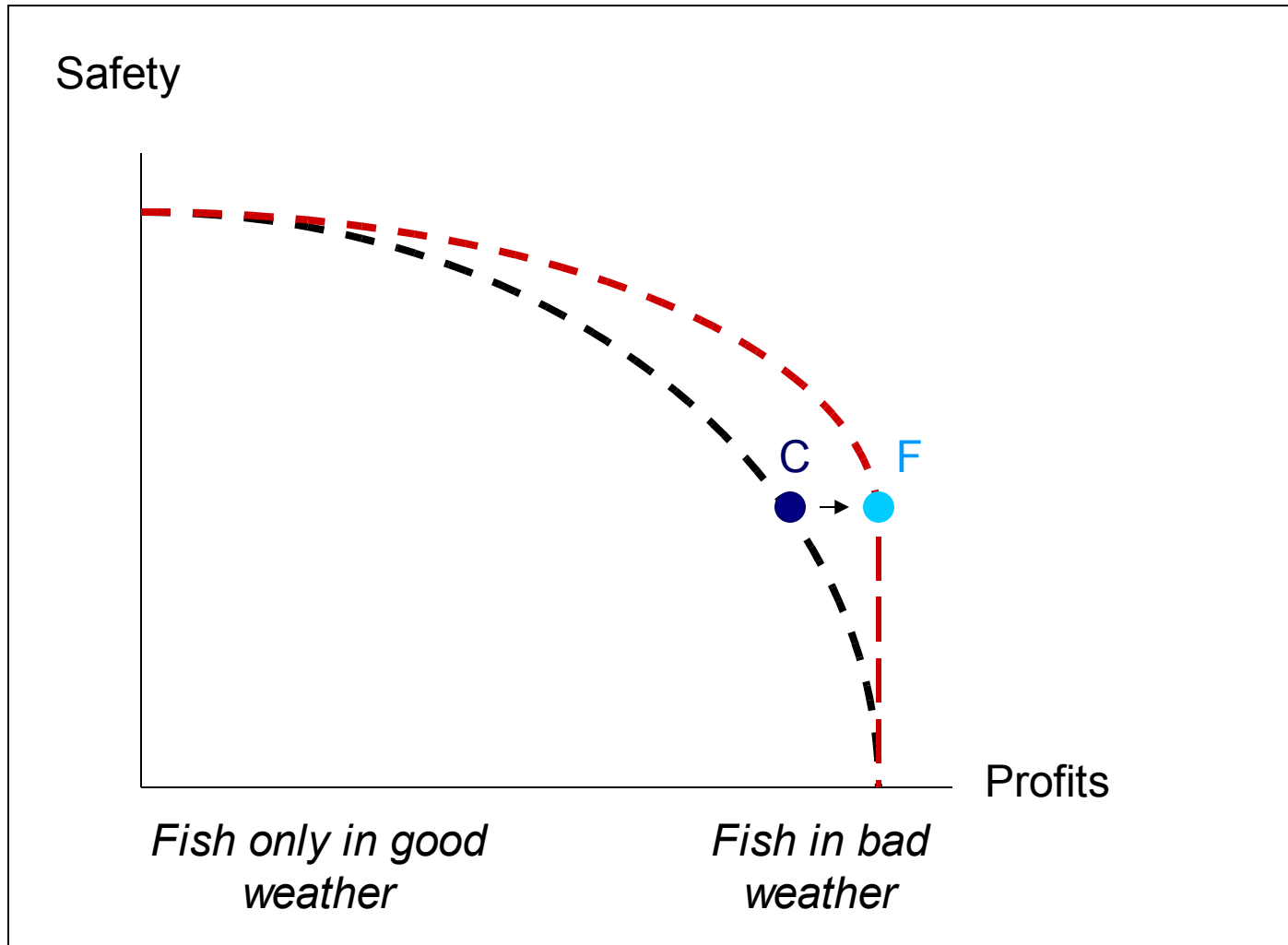


The fisherman won't necessarily choose E  
(a higher level of safety, same profits)





The fisherman may choose **F**  
(the same level of safety, more profits)



Fishermen make choices between  
safety and other goals.  
If managers make it possible  
for fishermen to be safer,  
fishermen won't necessarily choose to be safer.

What can we do about it?

Remove fishermen's choices  
between safety and other goals.

## How can we remove fishermen's choices between safety and other goals?

- Don't allow fishing without safety gear.
- Don't allow fishing without safety training.
- Don't allow fishing on unstable boats.
- Don't allow overloading.
- Don't allow fishing in bad weather.
- Enforce these rules.

Why do fishery managers manage fisheries in ways that contribute to safety problems?

## REASON #6

Managers may not understand how fisheries management contributes to safety problems.

## What do we actually KNOW about effects of management on safety?

- How much does management affect safety?
- What percentage of injuries, fatalities and vessel losses are attributable in part to management?
- How much safer could fishing be if we managed differently?

Is there a significant empirical literature?

No.

I can find very few studies which document relationships between management and safety empirically.

*“ . . . The impact that fisheries management regulations have on reducing or increasing dangers at sea . . . is not a new concept, but unfortunately, it is not one that has been widely studied.”*

(Petursdottir, Hannibalsson, & Turner 2001)

Some studies of Alaska fisheries have documented improved safety following implementation of individual quota management.  
(Hughes and Woodley, 2006)

We know that:

Logic suggests that management affects safety

There are many fisheries where management seems clearly to contribute to safety problems.

But

**WE HAVEN'T PROVED IT.**

We haven't demonstrated:

Specific effects of management on safety  
Specific safety benefits from changes in management.



Managers may not understand how fisheries management contributes to safety problems.

What can we do about it?

Do research to demonstrate the relationship between fisheries management and fishing safety.

Disseminate the research to fishery managers, fishermen, policy makers and the public.

## CONCLUSIONS:

What can we do to address management-related fishing safety problems?

1. Incorporate safety as a formal responsibility of fishery managers.
2. Apply political and moral pressure on managers to make safety a higher priority.
4. Provide managers with more funding to address safety issues.
6. Devise ways of managing more safely that don't conflict with other goals of fishermen.
7. Remove fishermen's choices between safety and other goals.
9. Research the relationship between fisheries management and fishing safety.

## AN ANALOGY

What would it mean for safety in the trucking industry if we had these laws?

- Truck drivers must be paid based on how continuously they drive.  
(even if fatigue leads to accidents).
- Trucks may drive only on Tuesdays.  
(even if the roads are icy on Tuesdays).
- Only small, light trucks are allowed.  
(even if small light trucks tip over when it is windy).

If we had these laws, would better tires and more driver training solve the safety problems in the trucking industry?

Given their safety implications, would the public tolerate these laws in the trucking industry?

We should not tolerate similar regulations in the fishing industry.

A photograph of a fishing boat in rough seas. The boat is tilted, and the water is turbulent with white foam. Several workers in bright orange gear are visible on the deck, appearing to be handling equipment or fish. The background shows a hazy, overcast sky and distant land.

**Additional comments**

**Researching the  
Relationship Between  
Fisheries Management  
and Fishing Safety**

Why haven't we demonstrated relationships between fisheries management and fishing safety empirically?

It is difficult.

- Just measuring rates of injuries, fatalities and vessel losses is difficult:
  - Problems with denominator data
  - Problems with numerator data
- Measuring how management affects safety is more difficult:
  - Many management factors affect safety
  - Many non-management factors affect safety
  - Fishermen's choices affect safety
  - Data are absent for many factors
  - Complex inter-relationships between factors

Measuring effects of changes in management regulations on safety is difficult because of:

- Absence of reliable denominator data
- Changes in management may change denominators
  - number of vessels, employment, fishing days
- Other safety factors don't stay constant
  - weather, markets, safety regulations
- A long period of time is required to obtain sufficient observations (e.g. annual fatalities) to identify statistically significant effects.

A useful next step would be an:

“International study of relationships between fisheries management and fishing safety”

## Study Goals

- Better understanding of management-safety relationships
- Raise awareness:
  - of safety among fisheries managers
  - of management among safety authorities



## Study design

- Multiple fisheries in multiple countries
- Focus on fisheries with most significant safety problems
  - (most total fatalities, injuries, vessel losses)
- Standard set of questions for each fishery
- International research team

## Standard set of questions for each fishery

- How significant are fishing safety problems?
- Does fisheries management have potential effects on fishing safety?
  - Is fisheries management perceived to affect safety?
  - What evidence exists of effects of management on safety?
- Have individual quota systems been implemented?
  - Have they improved safety?
- To what extent do fishery managers consider fishing safety?
  - As a formal mandate
  - In developing management policy
- To what extent do safety authorities consider fisheries management?
  - As a potential factor affecting fishing safety
  - In developing safety strategies